



EDITORIAL
LIBRARY

SPECIAL COMDEX ISSUE

FACE-OFF: New Electronic Books

AFTER HOURS: Coolest New Games

SOLUTIONS: Tips and Tricks from the Pros

PC LABS TESTS: Faster Graphics Cards



FIRST LOOKS:

- IBM, Toshiba Laptops
- Next-Generation CE
- Adobe Illustrator 8.0
- VirusScan 4.0
- First USB V.90 Modem
- HoTMetaL PRO 5.0
- Intel ProShare 500

MAGAZINE



WWW.PCMAG.COM

THE INDEPENDENT GUIDE TO PERSONAL COMPUTING VOL. 17 NO. 21 DECEMBER 1, 1998

The Best PC

**PICK
THE
RIGHT
ONE
FOR
YOU**

**PC
LABS
TESTS
102
NEW
PCs**

U.S.\$3.99/CAN.\$4.99/U.K.£3.25



**82 Better Ways
To Search the
Internet**



We can't say what applications she'll be using in five years.

We can, however, predict the monitor.



MultiSync

Software goes out of date. CPUs are superseded.

OUR NEW SHORT-DEPTH MULTISYNC E750
COMPLETES THE E SERIES FAMILY.

In the face of nearly chaotic change, it's reassuring to know you can count on MultiSync® E Series monitors for years to come. Take a look. Our CromoClear® and dot trio CRTs deliver all the contrast, sharpness and color-saturation you need for demanding applications. But what isn't so apparent is the reliability and flexibility we build into each monitor. Refresh rates up to 120 Hz, PC and Macintosh compatibility and

the optional IntelliBase® Series* monitor bases mean they'll grow as your needs change. And for added security, they're backed by a three-year warranty. MultiSync E Series monitors. With longevity like this, you might just retire before your monitors do.

	MultiSync E500*	MultiSync E750*	MultiSync E900*	MultiSync E1100*
Viewable Image Area	13.8"	16.0"	18.0"	19.8"
CRT	CromoClear	Short-depth CromoClear	Microfilter™ Dot Trio	Microfilter™ Dot Trio
Dot Pitch	0.25mm mask	0.25mm mask	0.26mm dot 0.22mm horizontal	0.28mm dot 0.24mm horizontal
Maximum Resolution	1280 x 1024 @ 65Hz	1600 x 1200 @ 73Hz	1600 x 1200 @ 77Hz	1600 x 1200 @ 77Hz

NEC

IntelliBase
Intelligent USB and audio solutions

NEC Technologies

To learn more or for a reseller near you, call (800) NEC-INFO or visit us at www.nectech.com. Expect more. Experience more.

InstaCare is a service mark, MultiSync is a registered trademark, AccuBlend, "Expect more. Experience more.", and the NEC Technologies logo are trademarks of NEC Technologies. *InstaCare service not offered on MultiSync GT Series. Two-year limited warranty applies. ©1998 NEC Technologies.

PITCHING NEW CLIENT
IN CONFERENCE ROOM AT 8 AM.

PRESENTING IN EIGHT CITIES
OVER FIVE DAYS.

PREPARING COMPLEX CAD
PRESENTATION.

ENJOYING LIFE-SIZE PROJECTION
OF HOME OPENER.

MultiSync
NEC Technologies

Presentation solutions for every presentation need. No matter what field you're interested in, there's a MultiSync®

projector that's right for you. Audiences will marvel at the vivid imagery that comes with our AccuBlend™ technology. You'll love the ease of use, the reliability, and the assurance of our InstaCare™ 24-hour replacement guarantee. The complete line of MultiSync projectors. There's one

	Brightness	Resolutions Supported	Applications
MultiSync LT Series	1000 lumens	640 x 480-1280 x 1024 with AccuBlend	Ultraportable design. Road warriors, your projector is ready.
MultiSync MT Series	900-1300 lumens	640 x 480-1280 x 1024 with AccuBlend	Perfect for conference/board room; smart choice for training and classrooms.
MultiSync GT Series	600 lumens	640 x 480-1600 x 1200 with AccuBlend	Makes high-end CAD/CAM presentations come to life.

for your exact needs, whether you're projecting first quarter earnings or the fourth quarter score.

NEC Technologies. Expect more. Experience more.

NEC


NEC Technologies

To learn more, and enter to win a 20" MultiSync LCD monitor, call toll-free (877) 487-8555. Or visit us at www.nec.com/necotech/mttl.

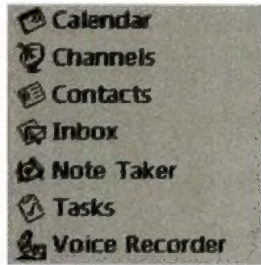
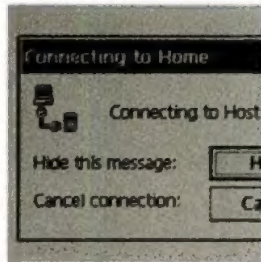
***It can continuously
sync with your PC so your
information is absolutely
current. Good news if you
like your information while
it's still relevant.***

Set your Palm-size PC to automatically sync when connected to your PC, and you never have to worry about it again. It just happens. And one less thing to worry about is one less thing to worry about. These Palm-size PC manufacturers use Windows® CE: Casio, Everex, Philips and Uniden.

*If you know **Windows**, you know **Windows CE**.*



www.microsoft.com/windowsCE/ppc **Microsoft**
where do you want to go today?[®]



Powered by
Microsoft
Windows CE



The More Things Change...

At *PC Magazine*, we're constantly watching the evolution of computers and software. With that, the magazine needs to evolve as well. The topics we cover, the tests we run, and the utilities we commission all change over time, reflecting changes in the industry. And in this issue, you'll notice a lot of changes.

This issue marks a shift in the way we approach several topics. For instance, as networking becomes mainstream, more of our readers are considering networking products. This trend has been accelerating for several years, and we've changed our editorial coverage to match it.

Several years ago, we introduced a Network Edition, with more networking information for those readers who wanted it. A little more than a year ago, faced with overwhelming demand, we moved that coverage into the full run of *PC Magazine*, creating a Net Tools section. Now, as networking becomes even more mainstream, we're going to integrate networking fully into everything we do. In every issue, readers will now find additional pages of First Looks specifically on network products, as well as a feature story on a networking and communications topic, such as this issue's look at desktop management software.

We'll also maintain and expand our coverage of Internet products and Web sites, which we plan to cover in every issue. For instance, this issue features our third annual look at Internet search services.

Perhaps the biggest change is our redesigned Solutions section. Our long-running Tutor and Utilities columns will now offer more-visual looks at their subjects, and the popular User to User section will continue to answer reader questions from a more visible location in the magazine. In addition, we are introducing an Internet User department to help readers navigate the ever-changing technology of the Net, and continuing our popular PCTech department, designed for programmers and power users.

Observant readers will notice changes in the design of the magazine as well. While the basic flow of the sections is unchanged, all of the regular sections and departments have been freshened and updated thanks to the work of our art director, Laura Baer, and her staff. You'll see a new look in all of the stan-

dard parts of the magazine, from this column to our After Hours section.

Every year at this time we also update the basic benchmark tests used to measure desktop performance. We've worked with our colleagues at Ziff-Davis Benchmark Operation (ZDBOp) on ZD Winstone 99, the latest version of our primary system benchmark test suite. Business Winstone continues to tie together the most common applications to test how well machines perform everyday tasks. This year, not only did we update the applications to reflect the office suites most users are now running, we redesigned the tests from the ground up so that multiple applications are loaded simultaneously, better reflecting the way people run business applications today. And with our High-End Winstone test suite, which covers more specialized applications, we're able to test the effects of multiple processors, now more common in workstations.

We also worked with our ZDBOp colleagues on updated and more accurate versions of ZD WinBench 99 component tests, which rate individual components of the systems. This year, we've made significant changes in our disk

tests and even more in 3D WinBench 99, reflecting the rapid changes in the evolving graphics market.

You'll see these tests used this issue in our reviews of professional PCs, corporate PCs, and graphics cards, and in many stories to come.

Despite these changes, our goal at *PC Magazine* has not changed. Our focus remains on providing in-depth labs-based comparisons of the broadest array of PC and Internet hardware, software, and networking products. And we'll continue to provide First Looks and reviews on the latest new products, information on what's going on in computing, and a range of commentary on computing issues.

Drop us a line at pcmag@zd.com and let us know how we're doing. **PC**

Despite these changes, our focus remains the same: providing in-depth labs-based reviews.



More on the Web:

Editor-in-chief
Michael J. Miller
answers your computing
questions every Tuesday,
exclusively at *PC
Magazine Online*.

www.pcmag.com/miller



**THEY SAID YOU'D NEVER MAKE IT.
THEY SAID THEY'VE SEEN YOUR KIND BEFORE.
THEY SAID THE MARKET WAS SATURATED.
THEY SAID IT ALL BECAUSE THEY WERE SCARED OF YOU.**



Stay ahead.

New Rules. New Tools.™



Micron™ Millennium® the #1 Ranked Power Desktop by PC World (Sept./Oct. '98) • Processor: Intel® Pentium® II processor 450MHz • **Cache:** 512KB internal L2 cache • **Memory:** 64MB 100MHz SDRAM • **Hard Drive:** 8.4GB Ultra ATA hard drive* • **Monitor:** 17" Micron 700Vx monitor (15.9" display) • **CD-ROM:** 32X max speed CD-ROM drive • **Modem:** 3Com/U.S. Robotics 56K WinModem** • **Graphics:** nVidia Riva 128, 8MB SGRAM 3D AGP graphics • **Sound System:** PCI 64-voice Wavetable sound • **Warranty:** 5-year/3-year Micron Power™ limited warranty • **Software Included:** Microsoft® Windows® 98, Microsoft Office 97 Small Business Edition, Norton AntiVirus • **Also includes:** New MicroTower case, Advent AV009 stereo speakers, 104-key enhanced keyboard, Microsoft IntelliMouse®, 3.5" floppy drive • **New Low Price • Starting at just \$1,699**

Choose 119 at www.pcmag.com/infolink

www.micronpc.com/pcmag BUY DIRECT 888-224-4156

©1998 Micron Electronics, Inc. All Rights reserved. Micron Electronics is not responsible for omissions or errors in typography or photography. All purchases are subject to availability. Prices and specifications may be changed without notice. Prices do not include shipping and handling and any applicable taxes. 30-day money-back policy does not include return freight and original shipping/handling charges, applies only to Micron brand products and begins from date of shipment. All sales are controlled by Micron Electronics, current terms and conditions of sale. On-site service is provided at sole discretion of Micron Electronics, Inc. A diagnosis determination for on-site service must be made by a Micron service technician prior to the provision of on-site service. The Intel Inside Logo and Pentium are registered trademarks and Pentium II, Celeron and MMX are trademarks of Intel Corporation. Microsoft, Windows, Windows NT and the Windows logo are registered trademarks of Microsoft Corporation. Product names of Micron products are trademarks or registered trademarks of Micron Electronics, Inc. Other product names used in this publication are for identification purposes only and may be trademarks of their respective companies. Note: advertised configurations may differ from award-winning configurations. *All hard drive sizes calculated with 1GB equal to 1 billion bytes. **For all Micron PCs configured with 56Kbps modems. Maximum transmission speed of up to 56Kbps when downloading files and 33.6Kbps when uploading. However, actual performance is dependent upon numerous factors and observed transfer rates may be less than the maximum potential.

UP FRONT

From the Editor-in-Chief4

Pipeline9

Letters21

Trends28

- Oracle 8i and Microsoft SQL Server are heading for a high-stakes showdown
- The Web finds its voice
- The 200MB floppy disk
- Software in your cereal

Inside PC Labs29

- 3-D Graphics "Optimizations"

Trends: Face-Off36

- Electronic books



First Looks41

- IBM, Toshiba laptops
- Next-generation CE
- Adobe Illustrator 8.0
- VirusScan 4.0
- First USB V.90 modem
- HoTMetal PRO 5.0
- Intel ProShare 500

Networking First Looks75

- IBM Netfinity 7000 M10
- Multitech MultiModem USB
- Compaq Microcom 705 Corporate Communicator
- WatchGuard Security System v3.1 with Firebox II

Second Looks80

- RealNetworks G2
- Sony VAIO 505-GX

COLUMNISTS

JAKE KIRCHNER30

BILL MACHRONE85

JOHN C. DVORAK87

INSIDE TRACK89

JIM SEYMOUR93

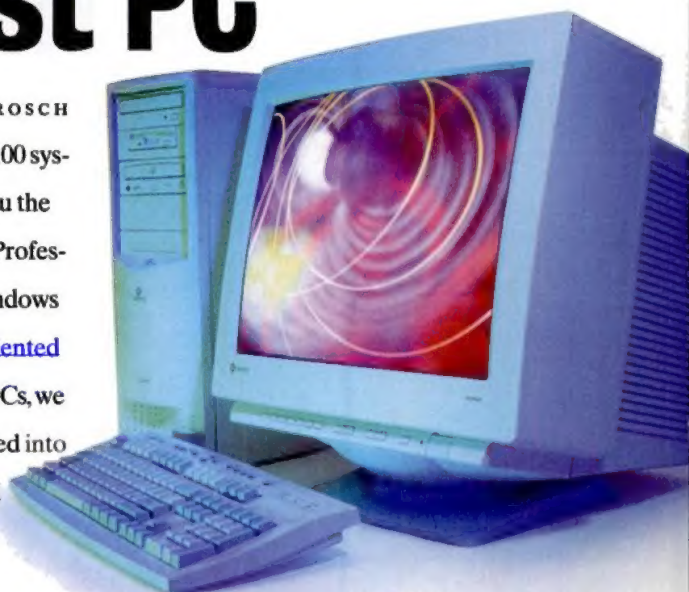
BILL HOWARD97

COVER STORY

The Best PC

BY CADE METZ AND WINN L. ROSCH

PC Magazine Labs put more than 100 systems through their paces to save you the trouble of doing it yourself! In the Professional PCs article, we review 40 Windows 98 machines meant for business-oriented or power users. Under Corporate PCs, we cover 62 corporate machines, divided into high-end Windows NT systems and mainstream Windows 95 units.



Professional PCs100

Aberdeen LLC	122	NexTrend Technology Inc.	130
All Computer Technology	122	Polywell Computers Inc.	130
American Microsystems	123	Premio Computer Inc.	130
Axis Systems	123	ProGen Systems	130
Compaq Computer Corp.	123	Quantex Microsystems Inc.	130
CompUSA	123	Racer Computer Corp.	130
CyberMax Computer Inc.	123	Reason Computer	134
Dell Computer Corp.	123	SAG Electronics	134
DMI Computer Technologies	126	Sys Technology Inc.	134
DTK Computer Inc.	126	Tagram System Corp.	134
Gateway	126	Tangent Computer Inc.	134
Hertz Computer Corp.	127	TigerDirect Inc.	134
HiQ Computer Systems	127	Total Peripherals Inc.	134
Initiative Technology Inc.	127	Unicent Technologies Inc.	134
Kingdom Computers	127	Unitek Technology Inc.	134
Maximus Computers Inc.	127	Xi Computer Corp.	134
Mega Computer Systems	127	Zenon Computer Inc.	134
Micro Express	127		
Micron Electronics Inc.	130	Price/Performance Index	104
MidWest Micro	130	Editors' Choice	111
NEC Computer System Div.	130	Ratings	111
NETIS Technology Inc.	130	Performance Tests	114
nextPC	130	Summary of Features	118

Corporate PCs138

Acer America Corp.	162	Polywell Computers Inc.	190
ACMA Computers Corp.	162	ProGen Systems	190
All Computer Technology	162	Quantex Microsystems Inc.	195
Axis Systems	162	Reason Computer	195
Compaq Computer Corp.	163	Royal Computer	195
Comtrade	163	SAG Electronics	195
Dell Computer Corp.	163	Sys Technology Inc.	198
DTK Computer Inc.	166	Tagram System Corp.	198
Duracom Computer Systems Inc.	166	Tangent Computer Inc.	198
Gateway	166	Toshiba America Information Systems Inc.	198
GST/Micro City Inc.	167	Total Peripherals Inc.	198
Hewlett-Packard Co.	167	Unicent Technologies Inc.	198
Highwave Technologies Inc.	167	Xi Computer Corp.	198
HiQ Computer Systems	167	Zenon Computer Inc.	198
IBM Corp.	176		
Maximus Computers Inc.	177	Price/Performance Index	154
Mega Computer Systems	182	Ratings	156
Micron Electronics Inc.	183	Editors' Choice	158
MidWest Micro	186	Performance Tests:	
NEC Computer Systems Division	186	High-End	162
NexTrend Technology Inc.	190	Mainstream	166
		Summary of Features	176

SPECIAL PULLOUT SECTION: SERVICE & SUPPORT

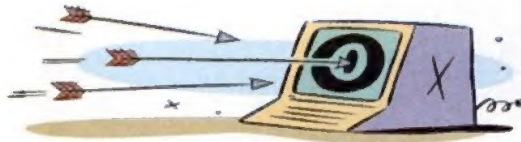
Rating PC Companies

BY ANUSH YEGYAZARIAN

Who's the best, according to its customers? Read what other PC Magazine readers think about the service and reliability of the top PC vendors. Here are some results from our annual survey145

How the Vendors Compare	147	Consulting Services	152
-------------------------	-----	---------------------	-----





INTERNET

Search Sites

BY DAVID LIDSKY AND NANCY SIRAPYAN

Our answer for finding what you want on the Web quickly and easily: Use the right tool for the job. We review several kinds of search sites here. And don't miss our section "A Tool for Every Task"—a survey of specialty sites to keep you from just giving up.....201

General Search Sites.....202	Search While You Surf.....212
Kids' Search Sites.....220	Metasearch Sites.....216
News Search Sites.....222	A Tool for Every Task.....224
Editors' Choice.....205	

HARDWARE

Graphics Cards

BY JAN OZER

It's a good time to upgrade. This year's class delivers much-improved 3-D performance but not at the expense of resolution or 2-D capabilities.....227

BioStar Crux 390.....244	Metabyte Wicked3D.....267
Canopus Spectra 2500.....244	Vengeance.....269
Creative Labs Graphics Blaster Riva TNT.....251	Number Nine Savage Reality 357, Revolution IV 32MB.....269
Diamond Monster Fusion, Viper V550.....252	Prolink 3D Combo plus.....269
ELSA Victory II, Erazor II.....257	Proside Trinosaur PRS-MP6000.....271
Great Magic Machspeed Raptor 740.....257	Quantum3D Raven.....271
Guillemot Maxi Gamer Phoenix.....260	Real 3D StarFighter.....273
Hercules Terminator Beast T9318SD, T9328SG.....260	STB Nitro 3200, Velocity 4400.....273
Intel Express3D.....260	3-D Business Apps—Finally!.....228
Leadtek WinFast 3D S320.....265	It's All in the Chips.....229
Matrox Millennium G200, Marvel G200-TV.....265	Editors' Choice.....232
	Performance Tests.....234
	Appian Duet: Double Vision.....244
	Summary of Features.....250

NETWORKING

Desktop Management

BY GREG ALWANG

For years we've been recommending that you manage the PCs, servers, and other devices on your network with one of the suites of tools made for that purpose. We're back again to review the latest and greatest crop of products that aim to cut your TCO and keep your network running smoothly.....277

LANDesk Management Suite 6.1.....280	Suitability to Task.....278
ManageWise 2.6, Z.E.N.works 1.0.....282	Editors' Choice.....280
Microsoft SMS 2.0, Beta 2.....286	What "DMI-Compliant" Means Today.....282
Seagate Desktop Management Suite 3.0.....288	How We Tested.....284
	Summary of Features.....286

Get more online at www.pcmag.com

Feature Story Exclusive:

PC Specifications

Care to compare and contrast some of the desktop PCs in our cover story? Get downloadable specs and test results at our site.

Plus: The Daily Download! A fresh new pick from the ZDNet Software Library every day.

Also Currently Online:

The Shopping List

Look over the sites we've evaluated in this issue and then join us online for direct links to all stories.

Plus:

► Test your PC for Y2K compliance at the Virtual Labs.



Multimedia Extra: CD plus Web Site

Top Software

- 30 utilities ready to install
- Searchable back-issue database
- Web site link to more free utilities and the best downloads



Visit Extra at www.pcmagextra.com. To order, call 800-335-1195 in the U.S. or 303-665-8930 elsewhere.

➔ See this issue's free utility in action at www.pcmag.com/download

SOLUTIONS



Tutor.....299

LCD monitors—their benefits and drawbacks.

User to User.....315

Customize the Office 97 Assistant—and more.

Utilities.....327

Create custom calendars with DaysEase.

Internet User.....333

Cascading Style Sheets level 2 refines positioning of Web page elements.

PC Tech.....351

New benchmark tests raise the ante in testing.

AFTER HOURS

Cool New Games.....401

We review five games that put your CPU to the test.



Blue's Clues.....406

The popular blue puppy comes to your PC.

Cosmic Combat.....406

Independence War soars.

Word Play.....408

PC-based language tutorials.

Also in This Issue:

PC Magazine Marketplace.....373
BusinessCard.....398
Advertisers' Index: Companies.....399
Coming Up.....408
Editorial Product Index.....416
Advertisers' Index: Products.....418
Abort, Retry, Fail?.....424



Introducing the INTEL® PENTIUM® II XEON™ PROCESSORS, the Key **Ingredient** in a Very Special Recipe: Intel®-based server/workstation

Designed to deliver maximum performance for enterprise and technical applications, Pentium® II XEON™ Processor represents the pinnacle of Pentium® II performance. It offers enhanced scalability and can be configured for 2-, 4-, 6- or more processors. To this multiprocessing capability, add a 100MHz bus and larger, faster L2 caches, and you have a recipe for maximum data throughput and maximum "bang for the buck."

□ 400 MHz processor available with 512K or 1 Meg L2 cache

Why PENTIUM® II XEON™ PROCESSORS?

The PENTIUM® II XEON™ PROCESSORS is specifically designed for mid-range to high-end workstations and servers whose applications involve intensive calculation (e.g. CAD and graphics) or heavy transaction processing (e.g., Internet and network servers or corporate data warehousing). For demanding application, PENTIUM® II XEON™ PROCESSORS offer the best price/performance available today.

SUPER WEB Server

For Your Internet/Intranet Applications

Intel® 440GX Chipset
Chassis w/ Power Supply
Single Pentium® II XEON™ Processor -
400Mhz/512k Cache
Adaptec Raidport II Card
256 MB SDRAM Memory
Two (2) 9GB Ultra-Wide Hard Disks
Integrated 100 Base-T Ethernet
8MB Diamond AGP Graphics Card
40x CD-Rom Drive
1.44 Floppy Drive

\$6.450

SUPER Workstation Jr.

Industry Leading Performance
Intel®440GX Chipset
Chassis w/ Power Supply
Single Pentium® II XEON™ Processor -
400Mhz/512k Cache
128MB SDRAM (PC - 100)
9.0GB SCSI Hard Disk
Integrated 100 Base-T Ethernet
8MB Diamond AGP Graphics Card
40x CD-Rom Drive
1.44 Floppy Drive

\$3,495



Choose 028 at www.pcmag.com/infolink



45545 NorthPort Loop East
Fremont, CA 93538
www.utron.com
Email Inquiry: Sales@utron.com

We Service You  With a BIG

Call For Our
Local Service Partners
1-800-933-7775
FAX: 510-656-1688

Note: Intel, The Intel Inside Logo and Pentium are registered trademarks and Pentium® II XEON™ is a trademark of Intel Corporation. All other names are properties of their respective corporations. Price and specifications are subject to change without notice. Not responsible for typographic error.



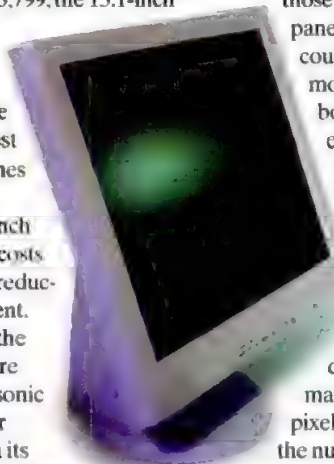
pentium® II
xeon™

Think Thin

Flat-panel displays are getting cheaper, lighter, thinner, and sharper.

When Compaq Computer introduced its TFT500 display on June 2, 1997, the company claimed it was "defining the industry bar for the future of flat-panel technology." Priced at \$3,799, the 15.1-inch active-matrix flat-panel monitor offered one of the industry's lowest prices. How times have changed. Compaq's 15-inch flat panel now costs \$1,199, a price reduction of 68 percent.

That's only the beginning. More recently, Panasonic passed another milestone with its PanaFlat LC90s (shown here), an under-\$2,000 19-inch flat panel that goes into production in November. Until now, large-screen flat panels have been luxuries, priced up to \$3,500. The new LC90s has



1,280-by-1,024 resolution, built-in speakers, and five USB ports. Several research projects now underway hold promise for a new generation of advanced flat panels. Philips Flat Display Systems recently launched one with Who Vision, a maker of fingerprint ID systems, to build fingerprint recognition sensors from thin-film transistors similar to

those used to build flat panels. The sensors could be integrated into mobile phones, notebook computers, and, eventually, flat-panel displays themselves.

Meanwhile, scientists at IBM Research's Advanced Display Technology Lab recently developed an active-matrix LCD with 200 pixels per inch—twice the number of pixels in a desktop monitor. And IBM's Yamato Laboratory in Japan recently claimed to have developed the world's thinnest active-matrix color LCD, just under 5 mm in thickness. IBM plans to use the panel in notebook PCs in 1999.

Talking to Your Hand

What's needed to move hand-held computers forward? Microsoft CEO Bill Gates likes speech recognition.

In a recent talk, Gates said speech recognition on hand-helds can help create uncluttered interfaces. He sees the day coming when, if you're confused by an error your hand-held device coughs up, you might speak a simple sentence into the device and it will correct itself. Small microprocessors fast enough to support speech recognition on hand-held platforms are already appearing.

Hand-Helds Catch On

1996 1997

Source: Dataquest (www.dataquest.com)

Your Next CPU

55
PERCENT

of respondents to a recent PC Magazine Online poll told us that their next PCs will include the fastest Intel CPU available. The AMD K6 will be the CPU choice of 33 percent of respondents, while 9 percent have their eye on a Celeron CPU and 3 percent are considering a Cyrix CPU.

The Billionaires' Club

Once again, *Forbes*'s annual list of the 400 richest Americans (published this year on September 1) was chock-full of high-tech billionaires. The news wasn't all good for nerds, though. Oracle chief Larry Ellison had dropped out of the top 5 rankings because of Oracle's sagging stock price. Things looked brighter for Dell Computer CEO Michael Dell, who at age 33 is the youngest *Forbes* 400 member. He had continued his climb up the ranks, with a net worth estimated at \$13 billion. That's even more than Microsoft CEO Bill Gates had at the same age.

Gates topped the *Forbes* 400 list once again, with a net worth estimated at \$58.4 billion. Gates's fortune had jumped \$18.4 billion since last year's roundup. That qualifies as the second-biggest one-year gain in the history of the list. Last year, Gates's net worth had soared \$21 billion.

Close contenders for inclusion among the top five tech fortunes were Oracle's Larry Ellison (\$4.9 billion), Gateway 2000's Ted Waitt (\$3.2 billion), and Hewlett-Packard's Bill Hewlett (\$3.2 billion). New entrants to the list from the high-tech world included Amazon's Jeff Bezos (\$1.6 billion) and Yahoo!'s David Filo (\$840 million) and Jerry Yang (\$830 million).

RICHEST NERDS

Bill Gates, 42
\$58.4 billion

Paul Allen, 45
\$22 billion

Michael Dell, 33
\$13 billion

Steve Ballmer, 42
\$12 billion

Gordon Moore, 69
\$7 billion

Source: *Forbes*, September 1, 1998 (individual age and net worth)

www.pomag.com

**Follow All
The Action at
Fall Comdex**

Join us online the week of November 16 for our live product Face-Offs. And check out page 36 for this issue's Face-Off.

**Talk Back
To Our Columnists**

Each week, our opinion makers give you their views. Make yours heard in TalkBack.

**Grab the
Daily Download**

Our software experts spend part of each day scouring ZDNet to find you the best new titles.

**Vote in Our
Weekly Online Poll**

Stop by every Wednesday afternoon or Thursday morning to participate in our poll.

**The Drivers
To Succeed**

Graphics accelerators depend on good drivers. That's why we're giving you the drivers we used to test the products in this issue's evaluation.

Subpoenaed Secrets

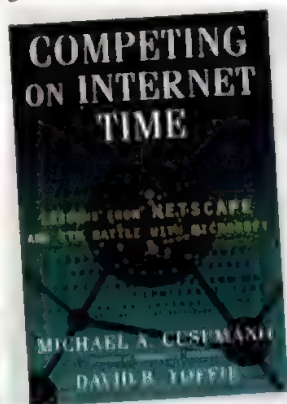
Just weeks before the Justice Department's case against Microsoft was set to go to court in October, Microsoft lawyers sought to subpoena the tapes of confidential interviews with over 40 Netscape employees. Authors Michael A. Cusumano of the Massachusetts Institute of Technology's Sloan School of Management and David B. Yoffie of the Harvard Business School conducted the interviews for their recently published book, *Competing on Internet Time: Lessons from Netscape and Its Battle with Microsoft*.

The tapes, Microsoft contended, would provide the company with key evidence that Netscape's missteps—and not Microsoft's actions—had caused Netscape's woes. According to one of those quoted in the book, “We’re in a really bad situation with our current code

base because we wrote this code three years ago and its major purpose in life was to get us in business as fast as possible. We should have stopped shipping this code a year ago. It's dead. This code should have been taken out back and shot.”

The judge denied Microsoft's request for the tapes. Free Press/Simon & Schuster rushed publication of the book so it would coincide with the start of the trial.

Inside Netscape: Business profs go behind the scenes.



Net Calling

For Internet telephony (which uses the IP network to transmit voice calls) to take off, the technology needs to be as easy to use as telephones. Also, all of the commercially available products need to be interoperable. AT&T recently launched AT&T Global Clearinghouse, a



one-stop shop for Internet service providers (ISPs) to set up and run phone-to-phone IP telephony services in 140 countries. The clearinghouse lets ISPs bypass complexities, such as customer service and billing, required in setting up their own global networks.

AT&T Global Clearinghouse acts as a single point of contact, posting the rate each ISP charges to transmit calls in its country and then offering those rates to all other ISPs that wish to send calls. AT&T Global Clearinghouse also handles the related routing management, billing, and more.

THE Y2K TAB 1995 TO 2001

Will the Y2K bug be a soon-forgotten annoyance or a catalyst for a global depression? Companies around the world are spending bundles on fixing it.

U.S. spending	\$121.96 billion
U.S. spending on outsourcing	\$66.30 billion
Worldwide spending	\$296.74 billion
Worldwide spending on outsourcing	\$161.78 billion

Source: IDC.

Top-Selling Retail Games

Starcraft Cendant Software

Deer Hunter GT Interactive

Diablo Cendant Software

Unreal GT Interactive

Rocky Mountain Trophy Hunter GT Interactive

Cabela's Big Game Hunter Activision

Microsoft Flight Simulator Microsoft

Myst Learning Company

Final Fantasy VII Eidos

Police Quest: SWAT 2 Cendant Software

Source: PC Data; data for August.

Mobile Scanning

Here's a new twist on hand-held digital appliances. Hewlett-Packard's new HP CapShare lets you capture letters, handwritten notes,



Captured: HP's new CapShare scans, displays, stores, and transmits documents via infrared or serial port.

maps, presentations, receipts, newspaper articles, magazines, and business cards and then send the scanned images over serial port or infrared to a printer, a PC, or a hand-held companion.

As you pass the base of the CapShare over the document that you want to scan, the device's contact image sensor and built-in digital microscopes capture the document as an image. Capturing the image takes about 6 seconds, and the unit can store up to 50 letter-size documents.

Check Out These Shades

Scrolling up your Excel spreadsheet won't feel like climbing Mount Everest, but with the new Sony PC Glasstron display, you'll have the feeling that you're viewing a 30-inch computer monitor from 1.2 meters away. The PC Glasstron LCD has two Super VGA-quality 0.7-inch LCD screens (each has 1.5 million pixels packed into a postage

stamp-size screen) and is worn like a pair of glasses. You can connect the display to a PC or to a VCR to watch videos.

The glasses also have a special mode that adjusts the transparency of the entire screen so you can see through them. The shades, which come with a set of stereo headphones, are available only in Japan, for 298,000 yen (around \$2,500).

EYE GEAR: Sony PC Glasstron.



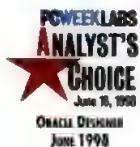
THIS ISSUE'S CONTRIBUTORS: Angela Hickman, Carol Levin, Sebastian Ruple, Don Willmott.

53-year-old programmer starts a career in modeling



Looking good.

Oracle® Designer lets you build the right applications—fast. First you visually model your business processes and database objects. Then you automatically generate a complete database application. That's the power of the industry's first and only repository-based modeling tool with 100% application generation. You can even reverse-engineer existing database applications into models. It's never too late to make a smart career move. Learn more about



the world's most popular modeling tool. Call 1-800-633-0751, ext. 15847, or visit www.oracle.com/info/13 to receive an Enterprise Developer Suite CD today.

ORACLE®
Enabling the Information Age®

HUNGRY FOR POWER?



WANT A GOOD NIGHT'S REST?



**WANT DIRECT ACCESS TO INSTANT
SERVICE AND SUPPORT?**



**THEN ALL ROADS LEAD TO THE DELL
SERVER VOTED "WORLD CLASS."**



DELL POWEREDGE 2300 SERVER
NEW PENTIUM® II PROCESSOR AT 450MHz

(RAID 5 CONFIGURATION)

- 128MB 100MHz ECC SDRAM
- 512KB Integrated L2 ECC Cache
- Three 9GB Ultra-2/LVD SCSI Hot-Swap Hard Drives
- 32X Max⁺ Variable SCSI CD-ROM Drive
- Ultra-2/LVD PowerEdge Expandable RAID Controller 2/SC
- HP® OpenView™ NNM Special Edition
- Intel® Pro/100B PCI Ethernet Adapter
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- Internal Hard Drive Bays to Support 6-1" Drives
- 3 External 5.25" Drive Bays plus Dedicated 3.5" Floppy Drive Bay
- 3-Year Next-Business-Day On-site⁺ Service
- 7x24 Dedicated Server Hardware Technical Telephone Support
- ★ Second Pentium II Processor at 450MHz, add \$1199.
- ★ APC Smart-UPS 700W Power Supply, add \$369.

\$5549

Business Lease⁺: \$204/Mo., 36 Mos.
Order Code #251102

DELL POWEREDGE 2300 SERVER
DUAL PENTIUM II PROCESSORS AT 350MHz

(DUAL PROCESSOR CONFIGURATION)

- 128MB 100MHz ECC SDRAM
- 512KB Integrated L2 ECC Cache
- 18GB Ultra-2/LVD SCSI Hard Drive
- 32X Max⁺ Variable SCSI CD-ROM Drive
- Microsoft® Windows NT® Server 4.0 (10 Client Access Licenses)
- HP OpenView NNM Special Edition
- Intel Pro/100B PCI Ethernet Adapter
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- Internal Hard Drive Bays to Support 4-1.6" Drives
- 3 External 5.25" Drive Bays plus Dedicated 3.5" Floppy Drive Bay
- 3-Year Next-Business-Day On-site⁺ Service
- 7x24 Dedicated Server Hardware Technical Telephone Support
- ★ Upgrade to Dual Pentium II Processors at 450MHz, add \$1200.
- ★ 128MB to 256MB 100MHz ECC SDRAM, add \$389.
- ★ Add an 18GB Ultra-2/LVD SCSI Hard Drive, add \$1099.

\$4749

Business Lease⁺: \$175/Mo., 36 Mos.
Order Code #251115

DELL POWEREDGE 2300 SERVER
NEW PENTIUM II PROCESSOR AT 450MHz

(DUAL PROCESSOR/RAID CAPABLE)

- 128MB 100MHz ECC SDRAM
- 512KB Integrated L2 ECC Cache
- 9GB Ultra-2/LVD SCSI Hard Drive (Hot-Swap Optional)
- 32X Max⁺ Variable SCSI CD-ROM Drive
- HP OpenView NNM Special Edition
- Intel Pro/100B PCI Ethernet Adapter
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- Internal Hard Drive Bays to Support 4-1.6" or 6-1" Drives
- 3 External 5.25" Drive Bays plus Dedicated 3.5" Floppy Drive Bay
- 3-Year Next-Business-Day On-site⁺ Service
- 7x24 Dedicated Server Hardware Technical Telephone Support
- ★ Upgrade from a 9GB to an 18GB Ultra-2/LVD SCSI Hard Drive, add \$450.
- ★ Microsoft Windows NT Server 4.0 (10 Client Access Licenses), add \$799.
- ★ 12/24GB Variable SCSI DAT Tape Backup Unit, add \$849.

\$3499

Business Lease⁺: \$132/Mo., 36 mos.
Order Code #251103

DELL POWEREDGE 2300 SERVER
PENTIUM II PROCESSOR AT 350MHz

(DUAL PROCESSOR/RAID CAPABLE)

- 64MB 100MHz ECC SDRAM
- 512KB Integrated L2 ECC Cache
- 4GB Ultra-2/LVD SCSI Hard Drive (Hot-Swap Optional)
- 32X Max⁺ Variable SCSI CD-ROM Drive
- HP OpenView NNM Special Edition
- Intel Pro/100B PCI Ethernet Adapter
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- Internal Hard Drive Bays to Support 4-1.6" or 6-1" Drives
- 3 External 5.25" Drive Bays plus Dedicated 3.5" Floppy Drive Bay
- 3-Year Next-Business-Day On-site⁺ Service
- 7x24 Dedicated Server Hardware Technical Telephone Support
- ★ Upgrade from 4GB to Three 4GB Ultra-2/LVD SCSI Hard Drives and an Ultra-2/LVD PowerEdge Expandable RAID Controller 2/SC, add \$1609.

\$2549

Business Lease⁺: \$97/Mo., 36 Mos.
Order Code #251104

NETWORK WORLD MAGAZINE'S WORLD CLASS AWARD

As the winner of the *Network World*⁺ magazine World Class Award, a Dell® PowerEdge® 2300 server⁺⁺ rated "first in overall score, thanks to its strong showing in serviceability, features, flexibility and manageability." Don't take chances. When you need a reliable server custom built for your business, call or visit our website.



TO ORDER BY PHONE

Keycode #04929

800-590-7455

M-F 7a-9p • Sa 10a-6p • Su 12p-5p CT

In Canada⁺, call 800-233-0702

In Mexico⁺, call 001-800-210-7607

GSA Contract #GS-35F-4076D

BUILD YOUR OWN AND ORDER ONLINE

BE DIRECT™ DELL

www.dell.com/buydirect

⁺⁺Call for details and pricing on the high-end, award-winning configuration, which included 400MHz dual processors, 128MB 100MHz SDRAM, 4 hard drives and RAID. For faster service, please have your order code and keycode available when calling.

⁺Prices and specifications valid in U.S. only and subject to change without notice. ⁺⁺For a complete copy of Guarantees or Limited Warranties, write Dell USA L.P., Attn: Warranties, One Dell Way, Box 12, Round Rock, TX 78682. ⁺On-site service provided via service contract between customer and third-party provider, and is not available in certain remote areas. Technician dispatched if necessary pursuant to phone-based troubleshooting with technical support personnel. ⁺Business leasing arranged by Dell Financial Services L.P., an independent entity, to qualified customers. Above lease payments based on 36-month lease, and do not include taxes, fees, shipping charges, subject to credit approval and availability. Lease terms subject to change without notice. ⁺Network World, June 15, 1998. ⁺32X Max/14X Min. For information regarding APC warranties, write to: APC, 132 Fairgrounds Road, West Kensington, R.I., 02892-9906, Attn: Customer Service. Intel, the Intel Inside logo and Pentium are registered trademarks of Intel Corporation. Microsoft and Windows NT are registered trademarks of Microsoft Corporation. HP is a registered trademark and OpenView is a trademark of Hewlett Packard Corporation. ©1998 Dell Computer Corporation. All rights reserved.



convergence

DEFINED BY SONY.
REFINED FOR YOU



The Sony Digital Mavica® Camera
It's as easy as a floppy.™

Discover firsthand how amazing the convergence of audio, video and computing can be. It's where stunning digital integration begins. And your creative opportunities never end because all of Sony's audio/video products are designed to work with all Sony VAIO® computing products. Seamlessly.

Take the sleek Sony Digital Mavica Camera, the world's only digital camera that uses a floppy disk as film. So you never run out of storage. Just take your pictures and transfer them to virtually any PC—without wires or adapters. Then e-mail them or post them to the Internet. Every Digital Mavica Camera can store up to 40 images per floppy. And some models allow you to record up to 60 seconds of live MPEG-1 video. Or record your voice and attach it to still images for professional-quality presentations.

Prices starting at \$499.00.

VAIO

ORDER IT DIRECT FROM SONY

www.sony.com/vaiodirect-digital

OR 1-888-596-VAIO TOLL FREE

Sony VAIO Direct™
Great Products. Great People.

©1998 Sony Electronics Inc. All rights reserved. Reproduction in whole or in part without written permission is prohibited. Prices and specifications are valid only in the U.S. and are subject to change without notice. Prices do not include applicable sales tax or shipping. Sony, Mavica, VAIO, Great Products, Great People, It's as easy as a floppy and the Sony logo are trademarks of Sony. Sony VAIO Direct is a service mark of Sony. All other trademarks are trademarks of their respective owners.



EDITOR-IN-CHIEF Michael J. Miller

EDITOR Jake Kirchner

SENIOR EXECUTIVE EDITOR Bill Howard

EXECUTIVE EDITORS Leon Erlanger, Peter McKie, Gail Shaffer, Don Willmott

DIRECTOR, PC LABS Steve Buehler

ART DIRECTOR Laura Baer

SENIOR NETWORKING EDITOR Frank J. Bertler, Jr.

SENIOR ONLINE EDITOR John Clyman SENIOR EDITORS Carol Venezia (First Looks), Sebastian Rupley (West Coast)

MANAGING EDITOR Paul B. Ross

RESEARCH EDITOR Jim Bartmo

SENIOR ASSOCIATE EDITORS Jamie M. Bseles (Hardware), Carol Levin (Trends), Sharon Terdeman (Technical Columns) ASSOCIATE EDITORS Toni F. Kistner (Networking and Communications), David Lidsky (Internet), John Morris (Software), Tom Ponzio (First Looks Online), Jennifer Triverio (After Hours), Anush Yeghazarian (PCs) ASSISTANT MANAGING EDITOR Kim Schueler PRODUCTION EDITOR Monica Sirignano COPY CHIEF Glen Boisseau Becker STAFF EDITORS Mary E. Behr, Doug Beizer, Paul Dwyer, Matthew Graven, Nancy E. Hirsch, Josh Levy, Carol A. Mangis, Michael W. Muchmore, Melissa J. Perenson, Michael N. Ruscignuolo SENIOR WRITERS Robert S. Anthony, Cade Metz STAFF WRITER Angela Hickman SENIOR COPY EDITORS Jennifer Golub, Joseph N. Levine COPY EDITORS Michael Feist, Jeremy A. Kaplan, Barbara McGeech, Ann Odvood ASSISTANT COPY EDITOR Sarah Pike PRODUCTION MANAGER Patricia Perkowski SENIOR LAYOUT EDITOR Lillian Gaffney LAYOUT EDITOR Michal Dluginski PRODUCTION SYSTEM SUPPORT ANALYST Nancy Goodman-Slayback LIBRARIAN Nancy Sirapyan LIBRARY ASSISTANT Dolores Williams EDITORIAL RESEARCHERS Adam Asch, Roderick A. Beltran, Gary Berline, Richard Brown, Emily Cohen, Sharon Nash, Angela Tuka DIRECTOR, IS TECHNOLOGY Craig Ellison NETWORK SUPPORT ANALYST Melvin Acevedo COMMUNICATIONS MANAGER Patricia Reger ASSISTANT TO THE EDITOR-IN-CHIEF Christine Curti ASSISTANT TO THE EDITOR Rita Arahmanian ASSISTANT TO THE EXECUTIVE EDITORS Christine M. Evelyn ADMINISTRATIVE ASSISTANT Christina Okang SYSOP, PC MAGNET Ken Hipple

CONTRIBUTING TECHNICAL EDITOR Neil J. Rubenking CONTRIBUTING EDITORS Bill Machrone (Vice President, Technology), Greg Alwang, Douglas Boling, Padraic Boyle, Bruce Brown, Sheryl Canter, John C. Dvorak, Les Freed, Daniel Grotta, Sally Wiener Grotta, David Linthicum, Edward Mendelson, Jan Ozer, Charles Petzold, Stephen W. Plain, Alfred Poor, Jeff Prossie, John R. Quain, Neil Randall, Sal Ricciardi, Steve Rigney, Winn L. Rosch, Jim Seymour, Barry Simon, Luisa Simone, Craig Stinson, M. David Stone

SENIOR ASSOCIATE ART DIRECTOR Lisa Kocaurek ASSOCIATE ART DIRECTORS Eileen Hanley, Michael Scowden ASSISTANT ART DIRECTOR Lora Morgenstern GRAPHICS DIRECTOR David Foster GRAPHIC ARTIST Mark Tynar ART PRODUCTION MANAGER Talar Min CONTRIBUTING PHOTOGRAPHER Thom O'Connor ASSISTANT TO THE ART DIRECTOR Frieda T. Smallwood

TECHNICAL DIRECTORS Ben Z. Gottesman (Software), Nick Stam (Hardware), Jeffrey G. Witt (Networking and Communications) DIRECTOR, OPERATIONS John R. Delaney SENIOR PROJECT LEADERS Richard Fisco (PCs), Jay Munro (Internet, PC Tech) PROJECT LEADERS Laura Cox (First Looks), Russ Iwanchuk (Networking and Communications), Diane Jucker (Software), S. Jae Yang (Hardware), Kevin Young (Networking and Communications) PROGRAMMERS Richard V. Dragan, Win Swarr PRODUCT TESTING MANAGER Charles Rodriguez TECHNICAL ANALYSTS Oliver Kavan, Melanio Lopez, Jacqueline Perales, Ryan Snedegar, Mark Valentine, Brad Walden, Martin Wong SUPPORT TECHNICIANS David Carela, William Pagan, Miriam Sampson, Sunita Sawh, Jeffrey Spade INVENTORY CONTROL MANAGER Tom Kennedy INVENTORY CONTROL COORDINATORS Richard P. Bifone, Bryan Hughes ADMINISTRATIVE ASSISTANTS Leslie Sorich, Courtney L. Trabon

PC MAGAZINE ONLINE

TECHNICAL DIRECTOR Larry Seltzer (Virtual Labs) MANAGING EDITORS Tin Albano, Heather Crambie SENIOR TECHNICAL EDITOR Thomas W. Giebel TECHNICAL EDITOR Webster T. Mudge DESIGNER Marcie Gandell STAFF EDITORS Jennifer L. Anderson, Troy Dreier, Richard Egen PRODUCTION EDITOR Matthew Slaybaugh

PUBLISHING DIRECTOR Nancy Newman

PUBLISHER Peter Longo

NATIONAL SALES DIRECTOR Vickie Pinsky GROUP BUSINESS DIRECTOR Bret Violette ASSOCIATE BUSINESS MANAGER Christine Holsten ASSOCIATE MARKETING DIRECTOR John Wisdom RESEARCH DIRECTOR Gordon Plutsky MARKETING MANAGER Dawn Gudelis

SENIOR ADVERTISING PRODUCTION MANAGER Ivis Fundichely ADVERTISING PRODUCTION COORDINATOR Simone Oliver-Weekes EDITORIAL PRODUCTION MANAGER Pamela J. Berkowitz MULTIMEDIA PRODUCTION MANAGER Louise Laberge

ADVERTISING OFFICE: One Park Ave., New York, NY 10016-5802; 800 33 MAG AD, 212-503-5100

THE INDEPENDENT GUIDE

PC Magazine is the Independent Guide to Personal Computing. Our mission is to test and review products and report fairly and objectively on the results. Our editors do not invest in firms whose products we review, nor do we accept travel tickets or other gifts of value from such firms. Except where noted, PC Magazine reviews are of currently available products. We review products without regard to advertising or business relationships with any vendor. Softbank, the majority holder of ZD Inc., has made a number of strategic investments in high-technology companies. A list of those companies is available online at www.pcmag.com/faq, and we will alert our readers to such investments whenever pertinent.

HOW TO CONTACT THE EDITORS

We welcome comments from readers. Send them to Internet address pcmag@zd.com or to PC Magazine, One Park Ave., New York, NY 10016-5802. Please include a daytime telephone number. PC Magazine's general number is 212-503-5255. The West Coast Operations number is 850-513-9000. We cannot look up stories from past issues, recommend products, or diagnose problems with your PC by phone. For an index of past issues and a list of upcoming stories, browse www.pcmag.com.

If you are dissatisfied with a product advertised in PC Magazine and cannot resolve the problem with the vendor, write (do not call) Ellen Askin, Advertising Department, at the above address. Please include copies of your correspondence with the vendor.

SUBSCRIPTION SERVICES

Internet: <http://subscribe.pcmag.com/service>.
U.S. and Canada: telephone, 303-685-8330; fax, 303-604-7455.
Elsewhere: telephone, 303-604-7445; fax, 303-604-1540.
Mail: PC Magazine, P.O. Box 54083, Boulder, CO 80322-4083.

Subscription rates. The one-year rate (22 issues) is \$49.97 in the U.S., \$85.97 elsewhere. Make checks payable to PC Magazine; U.S. currency only.

Back issues are \$8 each in the U.S., \$10 elsewhere (subject to availability). Prepayment is required. Make checks payable to PC Magazine; U.S. currency only. Mail your requests to Back Issues, ZD Inc., P.O. Box 53131, Boulder, CO 80322-3131.

Mailing lists. We sometimes make lists of our customers available to mailers of goods and services that may interest you. If you do not wish to receive their mailings, please write to us. Include your mailing label with any correspondence; it contains information about your subscription that will facilitate processing. Please allow 8 to 8 weeks for your first issue to arrive or for any changes in your subscription to take place.

Additional information on advertised products can be requested online at www.pcmag.com/infoink.

PC MAGAZINE EXTRA

PC Magazine Extra, the interactive CD-ROM companion to PC Magazine, is available quarterly. To order (\$49.95 per year in the U.S., \$72 in Canada, \$99 elsewhere), please call 303-685-8330 in the U.S. or 303-604-7445 elsewhere. Or write to PC Magazine Extra, P.O. Box 59494, Boulder, CO 80322-9494.

PC MAGAZINE ONLINE

PC Magazine is on the World Wide Web (www.pcmag.com) and The Microsoft Network (Go To pcmagazine). We operate PC MagNet, an on-line service of ZDNet, hosted by CompuServe. (For details, see the Utilities column.) PC Magazine subscribers receive free access to our online archives.

PERMISSIONS, REPRINTS

Material in this publication may not be reproduced in any form without permission. If you want to quote from an article or use PC Magazine's logo in conjunction with an Editors' Choice designation, write Chantal Tucker or fax her at 212-503-5475; for information on reprints, please contact ZD Reprints at 800-825-4237.

The following are registered trademarks of ZD Inc.: DOSMark, NetBench, PC, PC DIRECT, PC Labs, PC MAGAZINE, PC MAGAZINE AWARD FOR TECHNICAL EXCELLENCE, PC MagNet, ServerBench, WinBench, Winstone, and ZD.

The following are trademarks of ZD Inc.: Abort, Retry, Fail?, After Hours, BusinessCard, Corporate Developer, CPUmark, EasyComputing, Extending Your Apps, Features Plus, First Looks, First Looks Plus, Lab Notes, New & Improved, OFF THE STACK, PC Bench, PC Magazine At Home, PC Magazine CD, PC MAGAZINE EDITORS' CHOICE, PC Magazine Extra, PC Magazine Marketplace, PC Solutions, PC Tech, Pipeline, Power Programming, Quick Clips, Read Only, ScreenDemos, Tech Notes, Tutor, User-to-User, WinDrain, ZDigit, ZDNet, and ZiffNet.

Other trademarks and trade names used throughout the publication are the property of their respective owners.

Copyright (c) 1998 ZD Inc. All rights reserved. Reproduction in whole or in part without permission is prohibited.



Come see
us operate at
Fall Comdex.
Booth #L5244

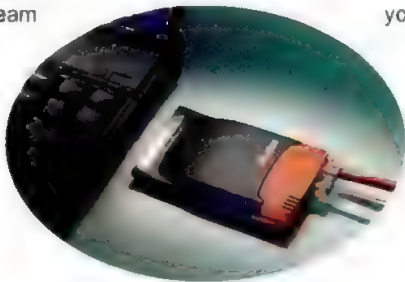
Donglectomy.

The dongle is gone. Removed. Obsolete. The next time you connect your mobile workforce, do it with less. Do it with RealPort™ Integrated PC Cards. They're the ones that cost you much less to own and support. With our Integrated PC Cards there's no need to stock extra cables or deploy an I.S. SWAT team every time a mobile user pages you in the middle of the night.

The family of RealPort Integrated PC Cards are the industry's first PC Cards with built-in connectors and could only come from Xircom, who for years has been changing the way mobile PC users connect.

Get it. And see how much easier life is when you remove something that's been ailing you.

1-877-RealPort www.xircom.com



Modem Technology By
microelectronics group



Xircom

Get mobile. Stay connected. Go places.

The Integrated PC Card
Nothing to Break. Nothing to Lose.

Isolation is not an option.





Information isolated is
information denied. A fact.
An idea. An opinion. Without
communication, there is no action.

Communication doesn't just happen.
It takes the right business tool.
Information must move across the
Internet and across platforms. UNIX®.
NT. NetWare®. There can be no limits.
Information must be managed and
gathered, accessed and communicated.
It must flow.

E-mail, alone, is not enough. The right
tool would have calendaring, document
management and Internet accessibility.
The right tool would be secure, affordable
and easy to use. The right tool is here,
now. The right tool is GroupWise® 5.5,
the complete collaboration system.

Because communication is not an option—
it is a necessity.

www.novell.com/optlon

Novell®

GROUPWISE

Wouldn't You
Rather Manage
Your PCs
Without Traveling
Across Town?



Starting U.S. street price. Monitor not included. International Data Corp. Q4 1997 unit sales figures. Actual PC manufacturers' sales year-to-date quarter. Intel Inside and Pentium are registered trademarks and MMX is a trademark of Intel Corporation. Microsoft and Windows are registered trademarks of Microsoft Corporation. ©1998 Hewlett-Packard Company. PPL-958



HP Vectra VL with Windows NT starting at \$1,309*

The HP Vectra with Windows NT® Workstation offers a superior desktop management solution by providing remote management, troubleshooting tools and more. Armed with HP TopTools running on Windows NT, your department can instantly track where your company's PCs are, which software is installed and whose machines are in need of immediate attention — whether those PCs are from different suppliers, in separate buildings or in altogether different cities. In addition, the affordable HP Vectra with Windows NT offers reliability, scalability, security and, of course, performance. What else would you expect from the fastest growing PC supplier? Managing your PCs just got easier. So remain seated and visit us at www.hp.com/go/vectra/wnt.



DVD playback

3D modeling

business applications

video conferencing

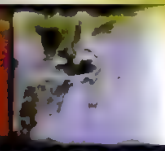


100 fps 3D gameplay

trilinear filtering

multitexturing

anisotropic filtering



The Future of 3D Speed Is Now

VELOCITY 4400™ is the future of technology, and you can have it now. It boasts a 128-bit, Twin-Texel processor and the power of 7 million transistors (almost as many as the Intel Pentium II) to deliver the fastest performance you'll find on any 2D/3D accelerator.

- Integrated 128-bit 3D/2D and video accelerator
- 16MB of memory for resolutions up to 1920x1200
- 250MHz RAMDAC for refresh rates up to 160MHz
- Output to monitor or TV (s-video & composite)
- Lifetime warranty and unlimited toll-free support
- Available for AGP and PCI bus

VELOCITY 4400 races ahead of the competition

3D WinBench '98'

VELOCITY 4400	1150
VIPER V550	1080
Graphics Blaster	1020
1200	563

High End WinMark '98'

VELOCITY 4400	298
VIPER V550	286
Graphics Blaster	279
Millennium G-200	273

STB products are available at



powered by



STB
www.stb.com

©Copyright 1998 STB Systems, Inc. All rights reserved. VELOCITY 4400 is a trademark of STB Systems, Inc. All trade names referenced are the trademarks, service marks or registered trademarks of their respective holders. Product may differ from photograph. Screenshots copyright 1998 and used with permission of GameSpot Inc., gamespot.com. Progres (G-Pole) and Rage (occlusion) 3D WinBench '98' and High End WinMark '98' conducted on an Intel® 5440BX Motherboard with Intel Pentium® II 400MHz system RAM 512K cache 1034x768x16bpp at 75Hz (unless otherwise noted) refresh without GDI bypass, as required for Microsoft certification. 1x Windows 98 version 4.10.190B DirectX 6.0 Gold release (build 318). Memory and driver versions: STB VELOCITY 4400™ (16 MB) AGP 4.10.01.0131 9.10.98 Diamond Viper V550 (16MB) AGP 4.10.01.0270 8.20.98 Creative Graphics Blaster Rev301 (16MB) PCI 4.10.01.2100-08 029 8.20.98 Matrox Millennium G-200 (8MB) AGP 4.10.01.0240 9.3.98. Specifications and performance scores subject to change without notice. R/L

Choose 247 at www.pcmag.com/infolink

LETTERS

HOT PROGRAMS?

I have two words for Microsoft: "Slow down!" I just finished reading about Microsoft Office 2000 in the "Software Preview" cover story (October 20, 1998), and as an IS director I am very concerned about support and user training all these new features will require. In our corporate environment, we just need a robust word processing program, but it appears the future of Microsoft Word goes far beyond this requirement and will take technical expertise, both from IS staff and users, that is far beyond the reasonable. My advice to Microsoft is to dedicate the resources to finally getting a fully functional Office 97 Suite out the door before we begin to worry about Office 2000.

EDWARD TERRY
Washington, DC

When I first saw that the October 20 issue of *PC Magazine* had Linux on the cover, I was really excited. Then I saw that you gave Linux only two paragraphs in the "Software Preview" story, one in the Desktop Operating Systems section and the other in Server Operating Systems. The article mentioned that Linux has no mainstream following, and you made it sound as if Linux is a complete failure as a desktop OS. I highly disagree. I started running Linux after becoming completely frustrated with Windows. I also believe Linux is gaining a mainstream following; however, it's hard to track because Linux is free and obtainable from many sources. Moreover, your server story never mentions that Linux is much more stable than Windows NT, as well as being faster and cheaper. I think you should have more articles that are Linux-related.

CHRIS FLYNN
via the Internet

DON'T SMACK IMAC

Thanks for the October 20 First Looks review of the new iMac ("The Intriguing iMac") and the performance results comparing it with 333-MHz Celeron and 400-MHz Pentium II machines. Just two thoughts: Since one of the iMac's selling points is its low cost, how about testing an inexpensive 233-MHz Pentium or Pentium II machine against the iMac for a Second Looks column? And since another of the iMac's selling points is good looks, how about showcasing some of the cool-looking PCs that are currently available, such as the Rock City PC at www.rockcity.net?

DAVE PARKER
via the Internet

While your First Looks article "The Intriguing iMac" was very good in general, several issues you raise are off the mark. Apple never says that the iMac is faster than the PCs you mention. In fact, what it says is that "its [iMac]

processor is more than twice as fast as processors in comparable consumer PCs, based on BYTEmark testing."

My concern is that you make it sound as if Apple is purposely exaggerating or deceiving the public. This is not the case. The point that Apple is trying to convey is that its chips are a state-of-the-art cutting-edge technology in a consumer computer.

DANIEL FLORES
via the Internet

In response to your First Looks article "The Intriguing iMac," I would just like to say that if I wanted to read about Macintoshes, I'd buy *MacWeek*. Let's keep *PC Magazine* about PCs!

ROBERT SWIRSKY-WARNER
via the Internet

As an IS director,
I have two words for
Microsoft: "Slow
down!"

Once again *PC Magazine* bashes Apple, this time with the iMac ("The Intriguing iMac," October 20, 1998). The article is about as contrived as it gets, and as editors, you have a responsibility to make sure you tell the truth in your reviews. Your reviewer matches a 2MB SGRAM iMac against a PC with 8MB of SGRAM and is disappointed when Ray Dream Studio 5 Renderer and Adobe Photoshop run faster on the PC than the iMac. Get real, guys! It doesn't take a rocket scientist to know that the PC with 8MB of SGRAM will outperform the less equipped iMac. I suggest that PC Labs does a real test: same software, same hardware, and so forth, across the board.

RUSSELL MAGGIO
via the Internet

We received hundreds of letters in response to our iMac review. Many readers argued that we should have upgraded the iMac's graphics memory (SGRAM) to the maximum 6MB from the default 2MB. They contended that the additional graphics memory would have let the iMac perform much better on some of the more graphics-intensive tests we presented. We knew our tests weren't sensitive to additional SGRAM, but because of the user feedback we felt it necessary to run the graphics-oriented applications with 6MB of SGRAM.

Our new test results were nearly identical. Check out the online story "More iMac Tests" at *PC Magazine* Web site for more information about them.—Ed.

CHEAP MONITORS

Why doesn't anyone test or review 14- and 15-inch monitors anymore? I read your October 6, 1998, review of 17- and 19-inch monitors ("17- and 19-Inch Monitors: Bigger and Better"), and thought that since the bigger monitors are getting better and less expensive, the smaller monitors ought to be serious bargains. I wanted a replacement for my 14-inch non-name-brand monitor, and I thought that searching for a 15-inch replacement until I can afford a whole new system would be easy and fun. No such luck.

KENNETH D. CRAWFORD
via the Internet

FEMALE FOOTBALL FAN

I was thrilled to see the Trends article "America's Game, Online" in your October 6 issue. As a dedicated fantasy sports player, a list of leagues and informational sites always comes in handy. Then I reached the part that says, "Fantasy sports games, in which mature adult males pretend to operate their very own

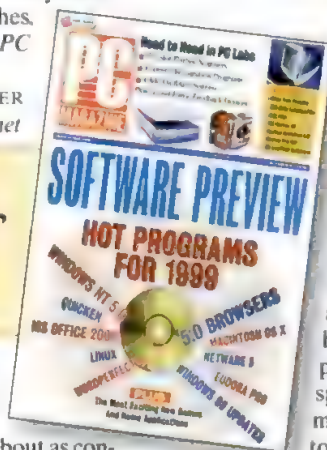
professional sports franchises....," and I was shocked.

I'm female, and I play Fantasy Football each and every year; I spend the entire pre-season scouting players, comparing stats, evaluating rookies; I pit my team against the 11 other owners in my league each week. I wasn't aware until I read your article that fantasy sports was a strictly male domain. Thanks for enlightening me. And now that I know I shouldn't be playing this game, might I suggest a different title for the article? Perhaps "Man's Game, Online" would have been more appropriate. I'll just run back to the kitchen now, thanks.

BARBARA IMAI
Saginaw, Michigan

FEMALE ROBOT FAN

I read Michael J. Miller's article "Your Personal Robot" (October 20, 1998) on LEGO Mindstorm with great excitement. As he described this toy, I got more and more excited. I thought, I'm going to get one of those, and maybe after I get tired of it I'll share it with my grandchildren. Then came the kicker: "I suspect LEGO Mindstorm may find a pretty big audience among the fathers...." I felt the same punch in the gut I got when I was 8 years old. My parents wouldn't buy me an Erector set, and my brother wouldn't let me play with his. How unfortunate that you spoiled a fine arti-



Mail-in Rebates
Mail-in Rebates: up to \$100 off.
Limited time only. See store for details.

**Canon's multifunction printers.
Because leadership is more than skin deep.**



*true photo quality with optional Photo Ink is not available on the i4400. Output shown printed using optional Photo Ink sold separately. Safari Inc. is a fictitious company. Any resemblance to other organizations is coincidental. ©1998 Canon Computer Systems, Inc. Canon is a registered trademark and MultiPASS, Bubble Jet, PhotoRealism and See What We Mean are trademarks of Canon in Canada. call 1-800-263-1111

You don't have to peel back many layers to see that Canon's whole family of multifunction printers all print, copy, fax and scan from one compact machine. That's a given. But it's the exceptional quality and performance built into each function that put these machines on top. Bar none.

It's no surprise when you consider our 60 years of imaging expertise.

Print Photo Quality

*Just add our optional Photo Ink to get the only true photo-quality multifunction printers anywhere.**

We were the very first company to introduce both 4-color and Photo-Ink-capable multifunction printers. We hold over 10,000 patents on Bubble Jet™ printing technology. Plus, we

created every major innovation in the multifunction category.

Now our MultiPASS™ C5500 and C3500 multifunction color printers lead the way again with cutting-edge technology. Add in our optional Photo Ink, and you've got the only true photo-quality products of their kind. Anywhere. Rather have laser? Our MultiPASS L6000 means serious business. Plus, they all come with our unbeatable software. So call 1-800-OK-CANON or visit www.ccsi.canon.com/leader. And before long, these champs will make your work a thing of beauty. **See what we mean.™**



The MultiPASS C5500.
Make your business look smart in brilliant color.

*State-of-the-art performance.
Photo-realistic color printing.
Color copies without a PC.
24-bit, 600 dpi color scanning.
Plain-paper Bubble Jet fax.*



The MultiPASS C3500.
Picture-perfect color printing and a whole lot more.

*State-of-the-art performance.
Photo-realistic color printing.
Plain-paper Bubble Jet fax.
Convenient grayscale copies.
400 dpi grayscale scanning.*



The MultiPASS L6000.
Dazzling laser output that means business.

*600 dpi laser printing.
Fast plain-paper laser fax.
600 dpi grayscale copies.
600 dpi grayscale scanning.*

Canon

cle by adding this thoughtless and hurtful comment.

LINDA C. JONES
VIA THE INTERNET

THE CRISIS

I loved your cover story on the Year 2000 Crisis (October 6, 1998). I'm a Y2K Coordinator for an electric utility in the Northeast, so I was particularly interested in Jim Seymour's article "My Biggest Worry." He expressed the opinion that electric utilities are the biggest risk for Y2K failure.

I agree with his opinion, but I think he missed making an important point. Why does this industry lag so far behind in preparedness? I suggest the answer is largely due to deregulation. I believe the grand push to deregulate the electric industry pulled a lot of attention, money, and resources away from Y2K at a time when we should have been getting into full gear to address the problem. You do a great job of covering the issues IT professionals want to know about, without making the process of learning seem like reading a manual.

MARK CHURCHILL
West Bridgewater, MA

Regarding Michael J. Miller's editorial "Y2K: Reality and Myth" (October 6, 1998), I think he forgot an important myth: that Y2K is a software problem. While it's true that many Y2K problems were created in software, many of them are a result of hardware as well. In the embedded systems world, time and date are typically handled with a battery-backed real-time clock chip. Many of these chips support only two-digit years. To resolve this problem, software must keep track of either the century or the four-digit year. But if there is no battery-backed RAM available,

Corrections and Amplifications

In the Trends Networking story "Management's Next Wave" (October 6, 1998), we incorrectly stated that Insight Manager XE is shipping with all new servers. In fact, Compaq is currently rolling out Insight Manager XE to selected customer sites only.

In our October 20 roundup of scanners ("What's Now—What's Next") the photos of the Avison Scan-Copier and HP 9100C Digital Sender (page 180) were inadvertently switched.

Also in the desktop scanner story "What's Now—What's Next," we accidentally failed to credit the artist, Stephen Stankiewicz, for the diagram "CGD vs CIS: Where the New Technology Hits and Misses" (pages 148–149).

In the After Hours story "Feel for the Game" (October 20, 1998), the photographs of the Logitech Wingman Force and Microsoft SideWinder Force Feedback Pro were inadvertently switched (page 314).

In the Trends story "The Wired Campus" (September 22, 1998) we mistakenly printed *Yahoo! Internet Life's* 1997 list of America's ten most wired schools, instead of the 1998 list. Here are the top ten most wired schools for 1998 (in descending order): Worcester Polytechnic Institute; University of Oregon; Indiana University, Bloomington; California Institute of Technology; Carnegie Mellon University; University of Illinois at Urbana-Champaign; Rensselaer; MIT; New Jersey Institute of Technology; and Dartmouth.

In our First Looks review of PDA software ("The Written Word," October 20, 1998), we incorrectly stated that ARTRecognition is part of a bundled product—smARTwriter—that includes Pocket Commander, a voice recognition program. ARTRecognition is the bundled product. It includes both smARTwriter, for handwriting recognition, and Pocket Commander, for voice recognition.

there is no place to store the information when the system is powered down. Battery-backed RAM can solve the problem.

MARK SCHEFFLER
via the Internet

I'm surprised that your article "The Year 2000 Crisis" (October 6, 1998) did not mention that most PCs now come with flash BIOS, which makes upgrading the BIOS easy. Simply download the latest BIOS from the vendor's Web site, boot from a DOS-boot disk, and run the downloaded flash-BIOS update program. This process is easier than installing another PC card and more reliable than installing a TSR-style fix. And best of all, it's free. So if your PC is equipped with flash BIOS, this should be the first solution to try. For those not wishing to upgrade, your article is a good reference for other Y2K options.

KINGSLEY L. SMITH
Madison, WI

Your October 6 articles on the year 2000 ("The Year 2000 Crisis") were some of the best I've seen. I've been a consulting Y2K project manager for the past two years and have seldom seen the print media produce such comprehensive information. I suggest that you add the free PC hardware test program from NSTL to your list. This test can be easily downloaded from *NSTL.com*. It's being used as a baseline for many of the major PC manufacturers today.

LARRY TOWNER
Richland, WA

PC PR

I read with great interest Jake Kirchner's recent column about Microsoft PR ("You Can't Run PR on a PC," October 6, 1998). He takes issue with Steven Brill's recent story that attributes a positive review of Internet Explorer by *PC Magazine* to "extensive

hand holding" of the magazine's reviewer by Microsoft. Although I was not aware of Mr. Brill's article prior to reading Kirchner's column, the essence of the story does not surprise me. Reviews of Microsoft software tend to be more credulous, while reviews of competitors' offerings tend to be hedged. These qualifications generally come in the form of extensive discussions or sidebar articles to the effect that Microsoft is working on a competing technology, or that similar features are promised in the next release of the comparable Microsoft product. This treatment led me to suspect that Microsoft employs an aggressive force of people to essentially 'handle' the media, courting editorial staff and reviewers to generate the right buzz for the company's products. And, of course, the size of Microsoft's advertising budget has its own force. Mr. Brill's article would seem to corroborate my intuition about the nature of this relationship behind the scenes. None of this makes *PC Magazine* (and by extension Ziff-Davis) or Microsoft a bad organization. The companies are doing what's in their best interests. But if the credibility of the company (as viewed by readers) is compromised, I have to think that the viability of any publication over time is at real risk.

KEVIN FINCH
via the Internet

START HERE

In regards to the PC Tech Tutor column on Usability testing ("Making Software Easier Through Usability Testing," October 6, 1998), the Start button was not developed by Microsoft for Windows 95; it was developed for Apple '84 when it was still called the "Apple Menu." Next I suppose you'll tell us that Microsoft "developed" the Recycle Bin as well.

CHRIS ALMAGUER
via the Internet

How to Contact Us

We welcome your comments and suggestions. When sending e-mail to Letters, please state in the subject line of your message which article or column prompted your response.

E-MAIL pcmag@zd.com

FAX 212-603-8799

MAIL Letters, *PC Magazine*

One Park Avenue

New York, NY 10016-5802

All letters become the property of *PC Magazine* and are subject to editing. We regret

that we cannot answer letters individually. To send submissions for PC Solutions, please see the sidebar "How to Contact Us" on the last page of that column.



Feed Your Need!

For Power... For Performance... For SPEED!!! – with the ActionBook 536T & 736T.

Introducing the next generation of notebooks from UMAX – ready to handle your most demanding multimedia and



internet applications with ease. Available with your choice of high-powered Intel®

Pentium® processor with MMX™ technology or Pentium® II processor 266 MHz, the **ActionBook 536T** and **736T** offer accelerated 3D graphics, video-in & video-out ports, PCI audio, a massive hard drive and stunning 3D sound. Extended battery life and built-in 56K V.90 modem make them fully equipped and ready to go – anytime, anywhere!

13.3" XGA TFT Active Matrix Display

Intel® Pentium® processor with MMX™ technology or Pentium® II processor 266 MHz

**266 MHz
Multimedia
Ready
ActionBook
536T/736T**

4 MB
Video
RAM

Includes
56K V.90
PCMCIA
Modem

All-in-one Design

Extended Battery Life – **Up to 4 Hours!**

Built-in 24X CD-ROM Drive



**CALL FOR MORE INFO!
888-235-UMAX**

WITH EXTREME CONNECTIVITY!	
	● 3.5" Floppy Disk Drive ● 24X CD-ROM Drive ● IR Port (IrDA 1.1) ● PCMCIA Sockets
	● Microphone In ● Headphone Out ● PS/2 Type Port ● Serial Port ● Parallel Port ● CRT Port ● Port Replicator ● Video In ● TV Out (S-Video) ● USB Port (full speed)



Actionbook 536T & 736T – fully equipped and ready to go – anytime, anywhere!

Model	Speed	Processor	VRAM	Display	RAM	Hard Drive	Cache	Modem	CDROM
536T	266MHz	Pentium® processor with MMX Technology	4MB	13.3" TFT	48MB	4.0GB	512K	56K V.90	24X
736T	266MHz	Pentium® II processor	4MB	13.3" TFT	64MB	4.0GB	512K	56K V.90	24X

UMAX®
www.umax.com

© 1998 UMAX Technologies, Inc. All rights reserved. ActionBook and UMAX are registered trademarks of UMAX Technologies, Inc. All other brands and product names are trademarks or registered trademarks of their respective companies. Intel, the Intel Inside logo and Pentium are registered trademarks and MMX is a trademark of Intel Corporation.

Choose 242 at www.pcmag.com/infolink



RUGGEDLY RELIABLE

We subject each portable to the strictest quality and durability standards in the industry. Every single Toshiba is built for the long haul.



FEATURE PACKED

Intel Pentium® II processor 233 MHz, 24X* CD-ROM, 4.1 billion byte hard drive, 32MB SDRAM, even a 3Com® 56K PC Card—all built-in.



Introducing the Toshiba Satellite® 4000CDS. The world's leading portable maker unveils the hardest-working, most reliable, feature-packed notebook \$1,699 can buy. A blazingly quick 233MHz powerhouse that burns through spreadsheets, multimedia, e-mail, you name it—without burning through budgets. Ounce for ounce,



FIRST-CLASS SERVICE & SUPPORT

From 36-hour door-to-door Express Notebook Depot repair to on-site service and unlimited technical support worldwide, our suite of services is ready when you are.



LEASE FOR JUST \$54 A MONTH

One of the Satellite 4000CDS's most attractive features? Its price. And with a great lease of just \$54 a month*, it won't break the bank.



**World leader does
a number on portables.**

byte for byte, dollar for dollar, the Toshiba Satellite 4000CDS is a combination of muscle, features and memory no other notebook can touch. The \$1,699 Satellite 4000CDS, exclusively from the award-winning engineers at Toshiba. Bank on it going a long way. And doing the very same for your dollar. To get your hands on this little number, surf www.toshiba.com or call 1-800-TOSHIBA.

TOSHIBA

The World's Best Selling Portable Computers.

at the end of the lease term. Lease rates shown based on Satellite 4000CDS at \$1,699 for transactions between \$25,000 and \$50,000. Other lease options may be available. Financing available through Toshiba Financial Services to qualified commercial customers. Rates are subject to change without notice. Prices, specifications and availability are subject to change. Dealer prices may vary. Offer valid in the U.S. only.

Choose 377 at www.pcmag.com/infolink

Dueling Databases

Oracle 8i and Microsoft's new SQL Server are heading for a high-stakes showdown.

At this year's Comdex trade show in Las Vegas in mid-November, a title fight is expected between database software heavyweights. Oracle 8i and Microsoft SQL Server 7.0 are slated for release at the show, and they take radically different approaches to managing data.

Oracle 8i has been grabbing headlines for its positioning as an *uber-database*, designed to manage over 150 different types of data formats via a new file system that one might normally expect to find in an operating system. SQL Server is going with the focused approach, eschewing support for herds of new file formats in favor of optimized performance and stability.

OS OR DATABASE?

In addition to Oracle 8i's new file system, it has a Java server, full Web server functionality, and more OS-like features. "The world's first Java server is built into Oracle 8i," says Oracle chief Larry Ellison. "Everything—user interface, program logic, data, Web server—everything is in the database. Oracle 8i transforms the role of the database from back-end data server for applications to a full-function Internet-based information management platform. In fact, Oracle 8i competes more against Windows NT than it does against SQL Server 7."

The database-resident Java Virtual Machine in Oracle 8i—for storing and executing Java code on a server—is complemented by a native Java compiler and a feature called Internet File System (IFS), which lets you store, query, and manage relational and nonrelational data. IFS can store 164 data types (from spreadsheets to Web pages, e-mail, and graphics). Oracle's new file system is the component that makes the



database competitive with operating systems.

But Tom Kreyche, product manager for SQL Server at Microsoft, says, "We don't agree at all with Oracle's philosophy. Oracle 8i is essentially a recycled version of the idea of a universal server, which hasn't worked before, as database players such as Informix have learned."

*"Oracle 8i has big implications, because it was designed specifically for the Internet and it's not just a database."
— Oracle CEO Larry Ellison*

*"We don't agree at all with Oracle's philosophy. Oracle 8i is essentially a recycled version of the idea of a universal server."
— Tom Kreyche, SQL Server product manager, Microsoft*

"How much work does an enterprise have to do to tune file systems for performance now, whether we're talking about NT, NetWare, or anything else?" asks Kreyche. "Oracle 8i may confuse and alienate database administrators seeking performance and stability. We're looking to NT,

Index Server technology, middleware, and other products to efficiently handle much of what Oracle is trying to do directly within the database."

ONE-STOP SHOPPING

The attraction of a Java-centric, universal server product that could perform well and provide one-stop shopping for database, file management, and application-hosting features is easy to understand. Oracle's Ellison has said that he foresees huge economic advantages from transforming the Web's business-to-consumer model into a business-to-business model, where businesses would hand their data over to third parties—saving expenses on hardware and software—and access data via browsers.

Ellison has suggested that doctors, for example, might find it less expensive to retrieve their data on a remote server managed by a third party at, say, a site called Doctors.com.

Microsoft takes the position that this approach raises all kinds of performance and security issues and that a more traditional client/server approach makes more sense. Ellison says that it's irrational for a company such as McDonald's to maintain a client/server database in every franchise. "There shouldn't be databases in hamburger stands," he says. "Databases are really complicated things." The answer, he says, is "a global server," accessible from browsers, instead of distributed information on lots of local servers.

"Internet computing will utterly kill client/server computing," he maintains. "Client/server is an uneconomic model, with an industry labor shortage that we're paying for now."

If the attraction of a universal server is easy to understand, it's also unquestionably hard to pull off. Oracle commands a lead over Microsoft in enterprise database software; Microsoft commands platforms and file systems. The reaction at Comdex and other developments in the coming months should reveal whether these critical software categories have marriage potential or are best left separated.—Sebastian Rupley

The Web Finds Its Voice

Would there be any easier way to access the Web than simply to ask for the page you wanted? Once Web pages are activated with an up-and-coming technology known as Voice Markup Language (VoxML), you'll be able to pick up a phone, call a "voice browser," and issue verbal commands to a Web site or corporate intranet application.

Instead of calling American Airlines on the phone for flight information, then waiting to talk to a rep, you'll be able to call the American Airlines Web site and ask for the status of a flight using natural-voice commands. In fact, you'll be able to access just about any site on the Web, for access to your personal bank records, weather forecasts, or your company intranet.

VoxML provides a common language for describing voice data. Motorola, which developed VoxML, foresees software developers writing VoxML-based applications that allow access to Web-based services using natural-voice commands.

In cooperation with industry partners Visa International, Broad-Vision, and Nuance Communications, Motorola plans to develop VoxML into an open platform, then to submit it to the World Wide Web Consortium for standards approval.

The move will offer major "mobile-productivity enhancements to users," says the director of Motorola's mobile-applications group, Mitesh Patel. "And a broadly accepted VoxML specification will allow telecommunications service providers to offer more value to their own offerings," he says.

Motorola is working on other fronts to bring more speech-enabled functionality to the mobile market. Also under development is Myosphere, a service from Motorola that will let you contact friends and colleagues listed in your organizer via one phone number—your Myosphere number. The service will be speech-enabled so you can use natural-voice commands to make phone calls, send pages, or get customized information such as weather, traffic, or stock market reports.

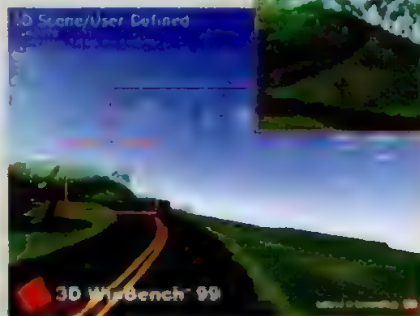
—Angela Hickman



3-D Graphics "Optimizations"



Last August, when PC Magazine Labs started planning this issue, we gathered the latest graphics cards and PCs and tested them with our newly updated ZD Winstone and ZD WinBench benchmark tests created by Ziff-Davis Benchmark Operation (ZDBOp). Every year at Fall Comdex, we distribute the magazine and the benchmark tests we used, which gives our test results and our methods plenty of exposure among vendors and readers.



we could assume triple buffering was working. When testing the Real3D StarFighter in front-buffer mode, ZDBOp noticed choppiness in playback that didn't seem right.

ZDBOp then videotaped the 3D WinBench 99 Racetrack scene running at 1,280-by-1,024 resolution, 16 bits per pixel in front-buffer mode. It appeared that every frame equal to 0, 2, 4, 6, or 8 modulo 31 was not displayed. In effect, 5 out of every 31 frames were dropped. Any performance results already gathered or published for the Real3D StarFighter cards using 3D WinBench 98 over the past year should be considered suspect. The StarFighter doesn't drop these frames when running in the triple-buffered mode this

Cutting corners: Three hundred triangles form the distant tree in our 3D WinBench roadway scene. The left image, produced by a graphics board that drops triangles, appears fragmented. The image below, produced from a well-behaved graphics board, is more detailed.



Our graphics board reviews always draw attention, since they have a great impact on the success or failure of the boards with PC vendors and in retail markets. The faster and more stable the board, the better. We also report when a graphics board implements optimizations that benefit only our benchmark test performance results, not real applications. In many of these cases, better scores come at the expense of graphics quality. Worse, some boards neglect major benchmark test operations or alter the tests for higher scores. The former are "false optimizations" and the latter are "benchmark test cheats."

This year was no exception. We detected what appeared to be one blatant cheat and other less severe cheats and false optimizations. (See "Who's the Fastest?" in this issue for more details.)

ZDBOp routinely ran 3D WinMark 99 inspection tests on graphics cards in front-buffer rendering mode to gather frame-rate statistics, even though we ran all formal testing using triple-buffered mode (if supported) this year. The front-buffer frame rates were compared to the triple-buffered rates to see if they came close. If the front-buffer scores were close to triple-buffered scores,

year, but the front-buffer frame-skip problem still exists in its driver.

The Diamond and Intel graphics boards and the STB Velocity 4400 also had problems. We found that the Velocity was eliminating triangles less than $1/2$ pixel in size, while Diamond and Intel eliminated triangles less than $1/8$ pixel in size. This strategy increases performance slightly at the cost of scene quality. It also violates Microsoft's Direct3D rendering rules. The vendors consider it a "performance optimization." Subsequently, they submitted drivers without this optimization for our testing.

As long as there are benchmark tests, there will be benchmark test optimizations and cheats. PC Magazine Labs will continue to be on the lookout so you don't get cheated.—Nick Stam and Dave Morey

STORAGE

The 200MB Floppy Disk

Like the 5.25-inch floppy disk before it, the now-standard 3.5-inch, 1.44MB HD floppy disk could soon fade into PC history. And several technologies are vying to be its successor.

Sony Electronics, which developed the 1.44MB HD floppy disk, has designed its High Capacity Floppy Disk (HiFD) to hold 200MB of data. And importantly, the HiFD can read, write, and format existing 1.44MB floppy disks. HiFD external disk drives will be available in stores in November. And by the first quarter of next year, you'll be able to replace your PC's internal floppy disk drive with a HiFD drive.

The problem with the HiFD, say industry watchers, is its high price. Sony plans to ship external drives for \$199 (list) and packs of one and three floppy disks for \$15 and \$40 respectively. So on the average you'll pay about one-third to

one-half more to use the HiFD than the Imation SuperDisk or Iomega Zip Drive. The price tag could also keep PC manufacturers from quickly moving to the HiFD. So far, Sony hasn't

the HiFD have already hit the market. In June, Caleb Technology released the UHD144 floppy disk drive, priced at \$79 (list) for the internal drive and under \$100 for the external one. The disks come in three-packs for \$16.

Meanwhile Imation's 120MB SuperDisk drive (\$80 to \$120, backward-compatible) is now a standard or optional component in systems from Acer, Compaq, Fujitsu, Gateway,

Big Disk

These four technologies are battling for the high-capacity removable-storage market.

	Caleb UHD144	Imation SuperDisk	Iomega Zip Drive	Sony HiFD
Capacity	144MB	120MB	100MB	200MB
Drive price	\$80-\$100	\$80-\$120	\$150	\$200
Price per disk or cartridge	\$5.33	\$10	\$10	\$15
Backward-compatible	Yes	Yes	No	Yes

announced any deals with PC system makers.

That leaves room for other removable-storage vendors, such as Caleb Technology, Imation, and Iomega. Cheap alternatives to

Hewlett-Packard, Hitachi, NEC, and Samsung. Imation is well ahead of the others in striking deals with PC makers. The company says it has 60 of them lined up so far.—Angela Hickman

Al Gore's High-Tech Hopes

When Bill Clinton first ran for president, he claimed he was friendly to the high-tech industries. It turns out, however, that even though Clinton is rather indiscriminate in his friendliness, the high-tech world has not benefited particularly from his attention. The same probably cannot be said for the possible presidency of that noted cybernaut, Al Gore.

With Gore less than a year from launching his own quest for the Oval Office, it's not too early to start examining his high-tech dreams for the country and the world.

Of course most people know that Gore is considered to be very hip when it comes to technology—he claims credit for coining the term “the information superhighway” 17 years ago. In the late 70s, when he was a young congressman from Tennessee, he was so enthusiastic about technology that his continual speech-making on the information age led his Capitol Hill colleagues to refer to him openly as “Congressman Bore” and had them rolling their eyes whenever he took the microphone.

Now this boring but earnest politician with the Harvard education and the wooden delivery may have the last laugh. His predictions for the importance of the “information superhighway” have proved true, and—more to the point—he has as good a chance as any of the putative candidates to become the next president.

If he does manage to gain the White House at the beginning of the new millennium, Gore will no doubt be eager to implement a high-tech agenda. As a key supporter of the current government program to spend

hundreds of millions of dollars to connect schools and libraries to the Internet, Gore has already shown he's ready and willing to put your money where his mouth is.

So what would the Gore high-tech agenda look like? He provided what amounted to an outline a few weeks ago when he delivered what he called a “Digital Declaration of Interdependence.” In a speech at an International Telecommunication Union meeting, Gore called for development of “a true global electronic village.” He said, “we have a chance to spread a new prosperity, a new literacy, a new love of freedom and democracy—and even a new sense of community to the farthest regions of the world.” To that end, he posed “five great challenges”:

1. Improve access to technology so that everyone on the planet is within walking distance of voice and data communications services within the next decade.
2. Develop a “universal translator” for voice and data that lets anyone on the planet talk to anyone else.
3. Create a “global knowledge network” of people working to improve delivery of education, health care, and agricultural resources, and to ensure public safety.
4. Use communications technology to ensure the free flow of ideas and support democracy and free speech.
5. Extend e-commerce opportunities and capabilities to every family and community in the world.

Say what you will about Gore, he thinks big and he has faith in technology that isn't shared by others who will seek the presidency. Over the coming year, I'll pause from time to time to look at the high-tech visions and positions of the leading candidates. Few of us will cast our ballots based solely on their views on technology, but it's clear the subject will be a theme in the election process.



Jake Kirchner

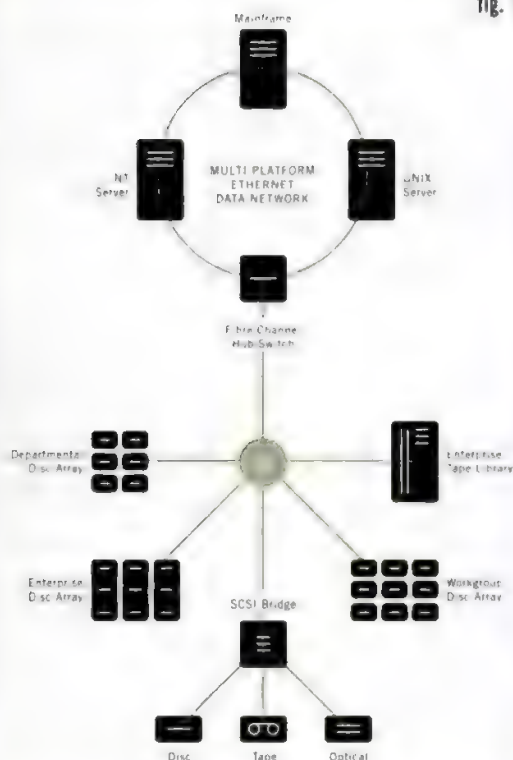


The background of the advertisement is a dark, textured surface. It features a series of bright, diagonal white lines that sweep across the frame from the top left towards the bottom right. Scattered throughout the background are various sequences of binary code (0s and 1s) in a light, monospace font. Some of these sequences are oriented horizontally, while others are rotated to follow the angle of the diagonal lines, creating a sense of digital movement and data flow.

If you use the Internet, it
doubles every six months.

**NOW MIGHT BE A GOOD
TIME TO TALK** about
revolutionary new ways
to store information.

fig. 1



STORAGE NETWORKING

STORAGE NETWORKING IS THE FUTURE OF STORAGE

A new concept for the enterprise, now being developed by Seagate and best-in-class partners. A new architecture based on high-speed fibre channel technology that creates a dedicated sub-network focused on storage will make your enterprise information into a continuously available resource and free your servers from back-up duties that consume valuable bandwidth. It will be scalable, allowing you to increase capacity with ease. This dedicated storage network will connect all platforms and data. It will provide centralized control, off-load overtaxed servers and speed up the entire network. As Storage Networking becomes a reality, Seagate intelligent storage devices and software will play a central role.

A STRATEGIC LOOK AT STORAGE. Today, information is more important than ever. Seagate is keeping pace.

A STRATEGIC LOOK

Seagate is the leader in today's storage solutions: first with high speed 10,000 rpm drives, first to deliver the fibre channel disc interface and drives capable of attaching directly to the network for scalable storage independent of servers. To learn more about Seagate's strategic approach to storage visit our web site.

FYI

 www.seagate.com/sn

©1998 Seagate Technology, Inc. All rights reserved. The Seagate logo and Information the way you want it are registered trademarks of Seagate Technology, Inc.

 **Seagate.**
Information the way you want it™

CD-ROMs Everywhere

1 A publisher puts a title through the Channelware Software Converter, which disables the executable file and embeds a Web address for the software to call for activation



2 The publisher gives away the software through mass distribution (for instance, in cereal boxes).



3 A user installs the CD-ROM and launches the program.



5 At the server, the customer chooses usage and payment options.

- Complimentary for 3 hours over a 1 day period
- Rent for 4 hours over a 3 day period for \$5.95 USD
- Purchase for \$19.95 USD

4 The software connects to the Channelware Server, which identifies the user's PC.

6 A machine-specific key is delivered over the Web in seconds. The key enables the executable file and lets the customer use the software.

7 The server verifies the contract and offers updates and personalized options.

SOFTWARE DISTRIBUTION

Software in Your Cereal

Get ready to be swamped with free CD-ROMs. They'll be hiding inside cereal boxes and handed out as freebies at football games. Software game titles could soon show up in the most unlikely of places—thanks to a new distribution system from Nortel Channelware, based in Ottawa, Canada, that uses the Web to activate game titles distributed on CD-ROM. "We're making software liquid," says Laura Dierker, a vice president of the company.

Channelware's Electronic Software Activation system, which it's now selling to software publishers, alters a program's executable file so the title won't run without a special key—actually, a 20K patch of code. When a potential customer loads the CD-ROM in a computer, the software automatically connects to a Channelware server site, which presents the user with options such as renting the software for a few hours, renting it for the weekend, or buying the software. Once the contract is complete, the Web site transmits an activation key that runs the program in seconds.

The technology for downloading a software key to unlock an application isn't new, but Channelware has taken the concept to a new level. The automatic connection to a Channelware server and the generation of a one-time security key take place before the title can be used. The system is designed not only to prevent piracy by turning friendly disk sharing into new revenue opportunities, but also to let publishers build relationships with game players, offering them new levels, special offers, and memberships in "tribes."

The security aspect of the technology also prevents multiple users from installing a single copy of an application. The server identifies eight unique details about the computer

that's calling it, such as the first time the trash can was used. Every time Johnny plays a game, the software first verifies that the computer has a contract. "We're careful not to invade privacy," says Dierker.

The invention is a product of parent company Nortel, which builds hardware and software for telephone switches. Engineers there originally came up with a security system for delivering software over the broadband net-

works. But the commercial potential of the technology is only now making its debut. "The system turns piracy into super-distribution," says Dierker.

With Channelware getting a per-transaction fee of 10 percent, the payoff could be winning. Electronic Arts and Interplay are the first software developers to have signed on with Channelware. The company is also running pilots with large toy companies and is in talks with major magazine publishers and sports entertainment companies. CD-ROMs that use Electronic Software Activation should start showing up this holiday season.—*Carol Levin*

SEMICONDUCTORS

Slow Road for Silicon

This year has been a lackluster one for semiconductor markets around the world, and it looks as if that will be true through December. But new data and some positive trends point to a better 1999.

The European semiconductor market is forecast to grow only 1.4 percent by the end of 1998; Japan, the American region, and the Asia/Pacific region are expected to decline by year's end. The turnaround isn't expected until mid-1999. Market research firm Dataquest forecasts 11.8 percent growth for the worldwide semiconductor market in 1999.

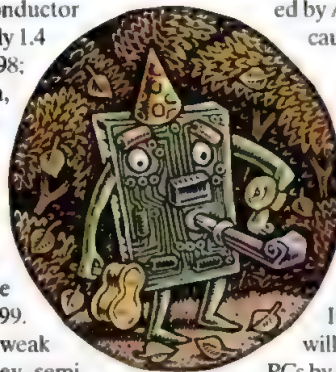
"The global impact of weak Asian economies means key semiconductor markets will likely not strengthen until the middle of 1999," says Joe Grenier, director of Dataquest's semiconductor device programs. "The semiconductor market will continue to confront oversupply. The foundry oversupply will persist for the next 18 months, and

the DRAM oversupply until mid- or late 2000."

Linley Gwennap, vice president of Micro-Design Resources, warns that "rising DRAM prices could cause bleeding chip makers to rein in production. This situation, exacerbated by Asian financial turmoil, could cause shortages next year."

Officials at Intel echo Gwennap's warning on DRAM, but Intel is focused on some very positive long-term trends in PC buying. For example, Internet access is now the number-one reason consumers cite for buying new PCs. According to Intel CEO Craig Barrett, there will be 1 billion Net-connected PCs by the year 2005.

Barrett says that three needs—for bandwidth, security, and ease of use—are the limiters to the growth of the computer and semiconductor industries. Intel is setting several platform-level initiatives to address these issues.—*Sebastian Rupley*



ELECTRONIC BOOKS

Read 'Em and ... Beep

When the words and pictures of a book are printed on paper, the same words and the same pictures appear on its pages forever. If you want to read a different book, you have to buy another one. When words and pictures are downloaded to an electronic book, you can read them, store them, and download a new set of words and pictures when you want to read something else.

less ambitious than the SoftBook, but it's easier to read and more enjoyable to use.

Priced at \$499 (list), the Rocket eBook weighs only 20 ounces and is about the size of a thick paperback, with rounded edges that make it easy to hold. Battery life is an impressive 20 hours with backlight on, 40 hours without the backlight. The 4.5- by 3-inch screen redraws almost instantly, and text is surprisingly

serial cable. You buy book texts through your Web browser by downloading them from online resellers. Once a text is on your hard disk, a separate RocketLibrarian program downloads it to the eBook through the serial cable. Consumers can't be expected to tolerate this procedure for long. NuvoMedia will have to find simpler methods if it expects the eBook to succeed.

At first glance, the SoftBook looks like a



ROCKET EBOOK

www.nuvmmedia.com

- 20 oz.
- 20- to 40-hr. battery life
- Requires PC's modem
- \$499

Electronic books are too new and too awkward for beach reading, but they portend the most significant technical change in book publishing since Gutenberg. *PC Magazine* tested pre-release versions of the compact NuvoMedia Rocket eBook (above left) and the larger SoftBook, from SoftBook Press (above right). Both will be shipping by the time you read this. Two other e-books—one from Librus and one from Everybook—were not ready for testing.

Both the Rocket eBook and the SoftBook display readable text and images on monochrome screens; both let you annotate text and add bookmarks. The eBook is technically

legible, with a choice of large and small font sizes. An on-screen control rotates the text by 90-degree increments so you can hold the unit whichever way feels most comfortable.

The interface is simple. Two well-placed buttons jump forward and back between pages, and icons on the screen bring up lists of books stored in the eBook, a text-search menu, and other navigation controls. You can attach an annotation to any word in the text by calling up an on-screen keyboard and tapping out the letters with your finger or the tiny stylus tucked in a slot in the unit.

The eBook is pleasant to read for a half-hour at most; your eyes will start complaining if you use it for longer periods. Downloading texts to the eBook is a cumbersome operation that requires plugging the unit into a cradle that gets its power from a wall outlet and is connected to your PC with an old-fashioned

SOFTBOOK

www.softbook.com

- 2.9 lbs.
- 5-hr. battery life
- Built-in modem
- \$299, plus
- \$9.95 per month

winner. With its soft leather cover and elaborate buttons and on-screen menus, complete with graphic navigation aids and icons for book-marking, this 2.9-pound unit conveys an image of high-tech luxury. You use the supplied stylus to scrawl doodles and annotations directly on the 8-by 6-inch screen, and they remain attached to the page until you erase them. Best of all, you simply connect a phone wire between the unit and your phone jack to download books. You never need a PC.

The SoftBook seems less attractive when you begin using it. The screen redraws slowly and is less readable than the Rocket eBook's. The 5-hour battery life is annoying at best, impractical at worst; and the unit is too heavy to be comfortable for long. The unit costs \$299 (list), but you have to buy a one-year subscription at \$9.95 per month—not including the price of the books—or commit to \$19.95 worth of books each month. You'll need to have a lot of trust in the SoftBook's publishers before you sign up.

Electronic books will probably find a niche as temporary storage for rapidly changing information such as legal regulations and technical manuals, not as a substitute for the paperbacks you buy in the airport. Unless you can't resist every new gadget, you may want to wait until electronic books offer content you can't get on paper. Meanwhile, these first products are technically dazzling, but second-best compared to the real thing.—Edward Mendelson

JOIN
US AT

Live Product Face-Offs: Las Vegas Hilton, Ballroom A

COMDEX

Tues., Nov. 17, 2:30-4:00

Today's Hottest
SOFTWARE

Wed., Nov. 18, 2:30-4:00

Today's Hottest
HARDWARE



**THEY WOULDN'T GIVE YOU THE TIME OF DAY.
THEY SAID YOU WEREN'T A PLAYER.
THEY WOULDN'T ACCEPT YOUR CALLS.
THEY'RE HOLDING ON LINE THREE.**



How successful do you want to be?
New Rules. New Tools.™

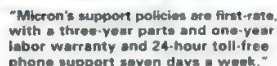




#1 RANKING FOR CUSTOMER SATISFACTION

- 2.** Micron's customers are really satisfied — just ask them. In fact, the influential readers of industry bible *PCWeek* ranked Micron desktops #1 in total customer satisfaction.¹¹ And *Home PC* readers voted Micron #1 in providing the industry's best service and support.

(IT DOESN'T GET ANY BETTER THAN THIS)



• PC World, "Best Buy," August '97

Micron Systems:
Over 100,000 deployed Micron
desktops, notebooks & servers

Favorite Feature:
Price/power ratio

Purpose:
Help maintain US security and freedom

For The Whole Story: www.micronpc.com

**Lead Map Designer, id Software
Creators of Quake & Quake II**

Micron Systems:
Micron Millennia 400 desktops

Favorite Feature:
400MHz - Of course

Purpose:
Test mind-bending levels of Quake II and help create one of the coolest games ever

For The Whole Story:
www.micronpc.com



Featuring Intel's Fastest Processor Ever

ust named #1 450MHz desktop by the editors of *CNET* and #1 Power Desktop by the editors of *PC World Magazine* (Millennia 400 DVD • October '98, *Millennia*® MAX 450 • *PC World* Best Buy November '98), Micron's Millennium desktop product line continues a long tradition of industry-leading, award-winning performance. Perhaps that's why some of the most prominent power users around rely on Micron. No matter how strenuous your demands, no matter how colossal the task, we invite you to put a Millennium desktop to the test. You'll be hard-pressed to find a Pentium® II processor based system as powerful and affordable as the Micron™ Millennium. And Micron's revolutionary new MPower™ purchase program makes Millennium ownership even easier, offering qualified users no interestSM or payments for six months as well as PowerXchange™ trade-in options on your current Pentium processor class PC towards a new Millennium desktop.

[illegible]

A non-refundable up-front freight charge applies for participation in PowerXchange to cover cost of return packaging and processing.

PAYING ISN'T FUN - BLOW IT OFF FOR 6 MONTHS

3. Micron's MPower™ program provides a myriad of flexible financing options including no-interest, no-payments for six months to qualified consumers as well as low monthly payment options on both consumer and business leases. No matter which award-winning system you choose, Micron makes PC ownership a breeze.

TRADE IN YOUR CURRENT PENTIUM® PROCESSOR-CLASS PC

4. Only Micron offers you the option to trade in and trade up today. Trade in your current Pentium processor-class computer system(s) from leading manufacturers and we'll give you wholesale rebates with the purchase of new Micron systems. We'll even send you boxes to package up your old PC's.

New Rules. New Tools.™

The Micron Difference: Rock-Solid Reliability. MPower™ and PowerXchange™ Programs. Industry-Leading Service and Support. There's a lot more to owning a system than having a computer sitting on your desk. You'll always want the latest technology, great pricing and service and support you can count on — and that's exactly what Micron's new MPower program is all about. Call today for details or visit www.micronpc.com/pcmag.



Award-Winning Complete Internet-Ready* 450MHz Systems Starting at Just \$1,699



Millennia C333



Millennia 350



Millennia 450



Millennia 450 MAX



Millennia 450 MAX

Model Name	Millennia C333	Millennia 350	Millennia 450	Millennia 450 MAX	Millennia 450 MAX
Processor	Intel® Celeron® processor 333MHz	Intel Pentium® II processor 350MHz	Intel Pentium II processor 450MHz	Intel Pentium II processor 450MHz	Intel Pentium II processor 450MHz
Cache	128KB Internal L2 cache	512KB Internal L2 cache	512KB Internal L2 cache	512KB Internal L2 cache	512KB Internal L2 cache
RAM	32MB SDRAM	64MB 100MHz SDRAM	64MB 100MHz SDRAM	128MB 100MHz SDRAM	128MB 100MHz SDRAM
Hard Drive	4.3GB Ultra ATA hard drive*	8.4GB Ultra ATA hard drive*	8.4GB Ultra ATA hard drive*	13.6GB Ultra ATA hard drive*	54.4GB 7200 RPM Ultra ATA hard drive*
Monitor	15" Micron 900Hz monitor (15.9" display)	17" Micron 700Hz monitor (15.9" display)	17" Micron 700Hz monitor (15.9" display)	17" Micron 700Hz monitor (15.9" display)	19" Micron 900Hz monitor (18" display)
DVD/CD-ROM	32X max speed CD-ROM drive	32X max speed CD-ROM drive	32X max speed CD-ROM drive	32X max speed CD-ROM drive	6.5X DVD-ROM drive
Modem	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**
Graphics	ATI Radeon 326, 4MB SDRAM 3D AGP graphics	ATI Radeon 326, 4MB SDRAM 3D AGP graphics	ATI Radeon 326, 4MB SDRAM 3D AGP graphics	ATI Radeon 326, 4MB SDRAM 3D AGP graphics	Diamond Viper 550 ATI Radeon™, 8MB graphics
Sound System	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound	PCI 64-voice Wavetable sound
Warranty	5-year/3-year Micron Power™ limited warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty	5-year/3-year Micron Power limited warranty
Software Included	Microsoft® Windows® 98 Microsoft® Home Essentials Norton AntiVirus	Microsoft® Windows 98 Microsoft® Office 97 Small Business Edition Microsoft® Outlook Microsoft® Internet Explorer Norton AntiVirus	Microsoft® Windows 98 Microsoft® Office 97 Small Business Edition Microsoft® Outlook Microsoft® Internet Explorer Norton AntiVirus	Microsoft® Windows 98 Microsoft® Office 97 Small Business Edition Microsoft® Outlook Microsoft® Internet Explorer Norton AntiVirus	Microsoft® Windows 98 Microsoft® Office 97 Small Business Edition Microsoft® Outlook Microsoft® Internet Explorer Norton AntiVirus
Also Includes:	New MicroTower case Advent AV009 stereo speakers 104-key enhanced keyboard Microsoft® IntelliMouse® 3.5" floppy drive	New MicroTower case Advent AV009 stereo speakers 104-key enhanced keyboard Microsoft® IntelliMouse 3.5" floppy drive	New MicroTower case Advent AV009 stereo speakers 104-key enhanced keyboard Microsoft® IntelliMouse 3.5" floppy drive	New MicroTower case Advent AV009 stereo speakers 104-key enhanced keyboard Microsoft® IntelliMouse 3.5" floppy drive	New MicroTower case Advent AV009 stereo speakers w/subwoofer 100MB Imomga Zip Drive 104-key enhanced keyboard Microsoft® IntelliMouse 3.5" floppy drive

Price	\$1,249 \$44/mo. TechRefresh Bus. Lease, 36 mos.**	\$1,499 \$52/mo. TechRefresh Bus. Lease, 36 mos.**	\$1,699 \$59/mo. TechRefresh Bus. Lease, 36 mos.**	\$2,499 \$87/mo. TechRefresh Bus. Lease, 36 mos.**	\$2,899 \$101/mo. TechRefresh Bus. Lease, 36 mos.**
			New Low Price		New Low Price

Upgrade to:	Upgrade to: 64MB SDRAM memory 6.4GB Ultra ATA hard drive 17" Micron 700Hz monitor (15.9" display) 100MB Imomga Zip drive	Upgrade to: 128MB SDRAM memory 10GB Ultra ATA hard drive 17" Micron Trinitron 700Hz monitor (16" display) 100MB Imomga Zip drive	Upgrade to: 128MB SDRAM memory 13.6GB Ultra ATA hard drive 19" Micron 900Hz monitor (18" display) 6.5X DVD-ROM drive	Upgrade to: 100MB Imomga Zip drive 100MB MM1000 flat panel speakers w/subwoofer 19" Micron Trinitron monitor (18" display)	Upgrade to: 256MB 100MHz SDRAM Microsoft® Natural Keyboard Elite
-------------	--	--	--	---	--

Price	\$1,545 \$54/mo. TechRefresh Bus. Lease, 36 mos.**	\$1,932 \$68/mo. TechRefresh Bus. Lease, 36 mos.**	\$2,232 \$78/mo. TechRefresh Bus. Lease, 36 mos.**	\$2,866 \$100/mo. TechRefresh Bus. Lease, 36 mos.**	\$3,214 \$112/mo. TechRefresh Bus. Lease, 36 mos.**
			New Low Price		New Low Price



*Contract with outside Internet Service Provider required. Internet service questions must be resolved by ISP and is not included.

ORDER DIRECT 1-800-515-9204
Call toll-free or order online at www.micronpc.com/pcmag



HELP FOR THE MOBILE WORKAHOLIC

When using TREK² on the plane, try not to laugh when the 14.1 inch monitor dwarfs the guy's next to you. It's just not a very nice thing to do.

Pack light — there's nothing worse than a carry-on that leaves divots in your shoulder, which is why the TREK² is as thin as 1.7" and as light as 7.2lbs.

Avoid the isolation induced by the single use, personal mini-soaps of the hotel room by staying connected with an optional 56K modem **.

IT'S ALMOST SILLY TO CALL A 300MHz NOTEBOOK WITH DVD, AGP GRAPHICS AND A 14.1" DISPLAY A "BUDGET PORTABLE"



AMY ALCORN, MD

Profile

System Micron TransPort TREK
Favorite Feature Brilliant Display
Purpose Online Medical Research
For The Whole Story www.micronpc.com



BOB PARKER

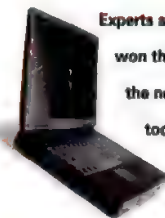
Owner/Founder Parker Motor Sports
Dominant Indy Race Car Team
Systems Micron TransPort TREK Notebooks/
Millennia Desktops
Favorite Feature: Speed — Of Course!
Purpose: Telemetry between Indy Car and Pit Crew
For The Whole Story: www.micronpc.com

TREK²



New! 300MHz
14.1" XGA TFT display
64MB SDRAM
3.2GB hard drive (removable)
DVD-ROM drive
Just \$2,999

PENTIUM[®] II PROCESSOR POWER, AGP GRAPHICS, DVD AND A 14.1" DISPLAY AT BREAKTHROUGH PRICING



Experts and industry pundits all agree that Micron makes some of the world's best notebooks. Our notebook lines have won the coveted *PC Magazine* Editors' Choice award six times along with a myriad of other prestigious awards. And the new TransPort[®] TREK² is no exception. *PC World* ranked the new TransPort TREK the #1 budget notebook available today*. And with a Pentium II processor 300MHz, AGP graphics, optional DVD and a gigantic 14.1" display, the TransPort TREK² is one of the best desktop replacements you can buy. Call Micron today and get a TransPort TREK² custom configured to your specific needs direct from the factory at unbelievably low prices.

"The TransPort TREK²
is the fastest Budget
Notebook We've Run
Through Our Mill."
—PC World, Ranked #1,
"Best Buy," April '99

©1999 Micron Electronics, Inc. All Rights reserved. Micron Electronics is not responsible for omissions or errors in typography or photography. All purchases are subject to availability. Prices and specifications may be changed without notice; prices do not include shipping and handling and any applicable taxes. 30-day money-back policy does not include return freight and original shipping/handling charges, applies only to Micron brand products and begins from date of shipment. All sales are controlled by Micron Electronics' current terms and conditions of sale. On-site service is provided at sole discretion of Micron Electronics, Inc. A diagnostic determination for on-site service must be made by a Micron service technician prior to the provision of on-site service. The Intel Inside Logo and Pentium are registered trademarks and Pentium II, Pentium III, Celeron and MMX are trademarks of Intel Corporation. Microsoft, Windows, Windows NT and the Windows logo are registered trademarks of Microsoft Corporation. Product names of Micron products are trademarks or registered trademarks of Micron Electronics, Inc. Other product names used in the publication are for identification purposes only and may be trademarks of their respective companies. Note: advanced configurations may differ from base-line configurations. *All hard drive sizes calculated with 1GB equal to 1 billion bytes. **The TransPort TREK 180MHz system was ranked #1 by PC World. At the time of ranking, this system was also named "Micron Machine" ***System Wizard Mobile Client not available with Windows NT. **Full hardware rebate prices are based on a 36-month lease and are available to business customers. Subscribers can qualify for 50-day same-as-cash and individuals for 6-month same-as-cash programs. If purchase advance and related charges are not paid in full within 90 days from purchase date for business or within 180 days from purchase date for individuals, finance charges will be assessed from purchase date. APR varies and is 17.99% as of 8/25/99 with a minimum finance charge of \$1.00. Term financing is available to individuals the home or business use. Please exchange accounts trade in of most major computer brands. Please call for details and the latest qualified brand list. Cash rebates are based on the average wholesale value of your PC per the Orion Blue Book, or other source chosen by Micron, adjusted for condition at trade-in. A non-refundable up-front freight charge applies for participation in PowerChange to cover cost of return packaging and processing.

Clients Don't Come To You

Work hard, but leave time for some major goofing off. And with a DVD-ROM drive and 3.5" floppy included, whether it's games or work, you'll have access to it all.

Don't be afraid to hug your notebook. Sometimes, nothing is more comforting to the weary road warrior than 300MHz of mobile desktop-replacing power.

12
VOL. 1 SEC. 03
pg. 12

The world is a book,
and those who do not
travel, read only a page.
—William Shakespeare, III



TREK² 233



TREK² 233



TREK² 266



New!
TREK² 300

Now Featuring
Brilliant 14.1" Display!
DVD-ROM drive!

Model Name	TREK ² 233	TREK ² 233	TREK ² 266	TREK ² 300
Processor	Intel® Pentium® II processor 233MHz	Intel Pentium II processor 233MHz	Intel Pentium II processor 266MHz	Intel Pentium II processor 300MHz
Cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache	912KB L2 pipeline burst cache
RAM	32MB EDO DRAM	64MB SDRAM	64MB SDRAM	64MB SDRAM
Hard Drive	3.2GB hard drive (removable)*	3.2GB hard drive (removable)*	3.2GB hard drive (removable)*	3.2GB hard drive (removable)*
Monitor	12.1" SVGA TFT display	13.3" XGA TFT display	14.1" XGA TFT display	14.1" XGA TFT display
Extra Storage	3.5" floppy disk drive (dedicated bay)	3.5" floppy disk drive (dedicated bay)	3.5" floppy disk drive (dedicated bay)	3.5" floppy disk drive (dedicated bay)
DVD/CD-ROM	24X CD-ROM drive (dedicated bay)	24X CD-ROM drive (dedicated bay)	24X CD-ROM drive (dedicated bay)	DVD-ROM drive (dedicated bay)
Graphics	4MB AGP graphics accelerator	4MB AGP graphics accelerator	4MB AGP graphics accelerator	4MB AGP graphics accelerator
Sound System	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone
Warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty
Software Included	Microsoft® Windows® 98 System Wizard Mobile Client™™™ Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition System Wizard Mobile Client™™™ Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition System Wizard Mobile Client™™™ Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition System Wizard Mobile Client™™™ Norton AntiVirus
Also Includes:	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports
Price	\$1,799 \$63/mo. TechRefresh Bus. Lease, 36 mos.**	\$2,299 \$80/mo. TechRefresh Bus. Lease, 36 mos.**	\$2,599 \$91/mo. TechRefresh Bus. Lease, 36 mos.**	\$2,999 \$105/mo. TechRefresh Bus. Lease, 36 mos.**

New Rules. New Tools.™



Micron™ notebooks are among the very best available. Our notebooks have been critically acclaimed by industry pundits and power users alike. And the TransPort TREK² is no exception. Call Micron today and order any of our award-winning notebooks custom configured to meet your specific needs.



ORDER DIRECT 1-800-515-9204
Call us toll-free or order online at www.micronpc.com/pemag

A circular library stamp with a thick black border. Inside the circle, the letter 'M' is prominently displayed in a large, bold, serif font. Below the 'M', the text 'VOL UNSEC 64' is printed in a smaller, sans-serif font. At the bottom of the stamp, the number '96 12' is printed.

Reliability

Pop

میں نے

ENTITIES HAVE ABOUT THE MICHIGAN CLIENTS

**THE NEW YORK PUBLIC LIBRARY
ASTOR LENOX TILDEN FOUNDATIONS
155 E. 42ND STREET
NEW YORK, N.Y. 10017**

[illegible]— *PC Computing*, A-List Top Pick, Nov. '98— *PC Computing*, A-List Editors' Choice

Introducing the New Micron NetFRAME 6200

ClientPro GS 400
Rev. '98

Best Web Server
NOCPANE 3100
Nov '98

[illegible]

you're starting to scratch the surface. Let's face it, when you're crawling around under someone's desk in a jungle of twisted cables because they want to see the dancing baby and you're the only one in the office that understands that "hot-swappable hard-drives" aren't something dirty, the last thing you need is a server that's anything but flawless.



THEY SHOULD CALL ME HERO.



©1998 Micron PC. All rights reserved. The First PC Company is a registered trademark of Micron PC.

New Rules. New Tools.



New! ClientPro CS 450

Intel® Pentium® II processor 450MHz
512KB Internal L2 cache
128MB SDRAM
6.4GB Ultra ATA hard drive*
17" Micron 7000x (15.9" display)
32X max speed CD-ROM drive
Diamond Viper 330 nVidia, 4MB AGP video
64-voice PCI WinVitality sound
3Com 3C905 WOL 10/100 network card
5-year/3-year Micron Power™ limited warranty

Intel LANDesk™ Client Manager
Microsoft® Windows NT® Workstation 4.0
Norton AntiVirus

SMART II hard drive monitoring
Chassis intrusion detection
Fan, temperature, and voltage problem reporting
Virus detection reporting
Remote Wake Up capability
MiniTower case
3.5" floppy drive
104-key enhanced keyboard
Microsoft IntelliMouse®

\$2,099 ^{\$73/mo.}
TechRefresh Bus.
Lease, 36 mos.



New! NetFRAME 2101

Intel Pentium II processor 333MHz
512KB Internal L2 ECC cache
64MB ECC SDRAM
4GB Ultra Wide SCSI-3 hard drive*
32X max speed CD-ROM drive
5-year/3-year Micron Power limited warranty
Dedicated server technical support, 7x24
1-year next-business-day on-site service***

Intel LANDesk Server Manager
Emergency Management Port Console

Supports up to two Intel Pentium II processors
Intel 440BX PCI chip set
100MHz front side bus and up to 1GB memory support
Integrated Symbios PCI Ultra Wide SCSI-3
dual channel controller
Intel PRO/100+ Server Adapter
Integrated RAID upgrade support
5 expansion slots: 3 PCI, 1 ISA, 1 shared PCI/ISA
10 drive bays: 1 external 3.5", 3 external 5.25"
6 internal 1.0" hard drive bays (5468 max.)
Integrated SVGA graphics 2MB
Microsoft mouse, 104-key enhanced
PS/2 keyboard
3.5" floppy drive

\$1,899 ^{\$66/mo.}
TechRefresh Bus.
Lease, 36 mos.



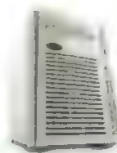
NetFRAME 3100

Intel Pentium II processor 400MHz
512KB Internal L2 ECC cache
64MB ECC 100MHz SDRAM
4GB Ultra Wide SCSI-3 hard drive*
32X max speed CD-ROM drive
5-year/3-year Micron Power limited warranty
Dedicated server technical support, 7x24
1-year next-business-day on-site service***
NOS support (3 first-year incident resolutions), 7x24

Intel LANDesk Server Manager
Emergency Management Port Console
Microsoft Windows NT Server 4.0
(10-user license)

Supports up to two Intel Pentium II processors
Intel 440BX PCI chip set
100MHz front side bus and up to 1GB memory support
Integrated Symbios PCI Ultra Wide SCSI-3
dual channel controller
Intel PRO/100+ Server Adapter
Integrated RAID upgrade support
5 expansion slots: 3 PCI, 1 ISA, 1 shared PCI/ISA
8 drive bays: 1 external 3.5", 2 external 5.25"
5 hot-swap redundant 1.0" hard drive bays
Integrated SVGA graphics 2MB
Microsoft mouse, 104-key enhanced
PS/2 keyboard
3.5" floppy drive

\$3,599 ^{\$116/mo.}
TechRefresh Bus.
Lease, 36 mos.



New! NetFRAME 6200

High-Powered Server For Fast-Growing Businesses

Intel Pentium II Xeon™ processor 400MHz
512KB integrated L2 ECC cache
128MB ECC 100 SDRAM
9GB U2W LVDS SCA 1" hard drive*
32X SCSI CD-ROM drive
5-year/3-year Micron Power limited warranty
Dedicated server technical support, 7x24
1-year next-business-day on-site service***
NOS support (3 first-year incident resolutions), 7x24

Intel LANDesk Server Manager 6.0
Emergency Management Port Console
Microsoft Windows NT Server 4.0 (10-user license)

Supports up to four Intel Pentium II Xeon processors
Options for 512KB or 1MB L2 cache Xeon processor
Intel 450NX PCI chip set
4GB ECC EDO support (16 DIMM sockets)
7 expansion slots: 6 PCI, 1 shared ISA/PCI
Integrated Symbios U2W LVDS dual channel controller
Intel PRO/100+ Server Adapter w/Adaptive Load
Balancing and Adapter Fault Tolerance software
6 internal, hot-swappable hard drive bays
1 hot-swappable 400-watt power supply
(upgradable to three w/redundancy)
Integrated SVGA graphics 2MB
3 external 5.25" media bays
Free-standing pedestal chassis standard
(rack mount option available)
Emergency Management Port (EMP)
10MB and cluster support
104-key enhanced PS/2 keyboard
Microsoft mouse
1 parallel, 2 serial ports
3.5" floppy drive
*Add 3Com Gigabit EtherLink Network Interface
Card for \$800*

\$6,999 ^{\$226/mo.}
TechRefresh Bus.
Lease, 36 mos.

THE NEW MICRON NETFRAME 6200 IS THE FIRST SERVER AVAILABLE ANYWHERE WITH 3COM'S GIGABIT ETHERLINK SERVER NETWORK INTERFACE CARD.

The 3Com® Gigabit EtherLink® Server Network Interface Card features full duplex 32/64-bit gigabit performance, providing instant relief from server bandwidth problems. And 3Com's DynamicAccess® software optimizes network performance and adds intelligence to the server Network Interface Card.



ORDER DIRECT 1-800-515-9204

Call toll-free or visit us online at www.micronpc.com/pcmag

Choose 098 at www.pcmag.com/infolink



What you're doing.

What your



processor's doing.



*The Intel® Pentium® II processor
does more than meets the eye.*



While you're working on your business applications in the foreground, the power **pentium® II** of the Pentium® II processor is hard at work for you behind the scenes. That means, while you create a presentation or update a spreadsheet, your PC can handle a multitude of other tasks simultaneously. Tasks like searching the Web, compressing and encrypting e-mail, or managing your calendar. Without getting bogged down. So not only will your PC accomplish more, so will you.

The Intel® Pentium II processor has the performance you need today plus the power to fuel the applications of tomorrow. To find out more, visit us on the Web or see your PC reseller. [▶ www.intel.com/PentiumII](http://www.intel.com/PentiumII)

intel®

The Computer Inside™

© 1997 Intel Corporation. Intel and Pentium are registered trademarks of Intel Corporation. All other brand and trade names are the property of their respective companies.

HAVE WE GOT YOUR ATTENTION YET?



1998 Vision Master 450



October 6, 1998
VisionMaster 450



May 1998 VisionMaster 450



1998
Perfect Five-Star Rating
January 1998
VisionMaster 450



VisionMaster 450
\$599 ESP



April 1998 VisionMaster 450

The awards we are winning are your assurance that iiyama monitors are built to meet the strictest standards of quality. For exceptional clarity, durability and low emissions, iiyama monitors are the clear choice.

CRT Monitor Model/ Viewable Area	TCO	Dot Pitch/ CRT Type	Max. Horizontal Scan Rate	Max. Resolution	Est. Street Price
21" VisionMaster Pro 502 (19.5" VIS)	TCO '95	0.28mm/AG	110kHz	1800 x 1440@74Hz	\$999
VisionMaster Pro 501 (19.5" VIS)	TCO '95	0.28mm/AG	96kHz	1600 x 1200@75Hz	\$839
VisionMaster 502 (19.5" VIS)	TCO '95	0.27mm/dp	110kHz	1800 x 1440@74Hz	\$899
VisionMaster 501 (19.5" VIS)	TCO '95	0.27mm/dp	96kHz	1600 x 1200@75Hz	\$839
18" VisionMaster Pro 450 (18.0" VIS)	TCO '95	0.25mm/AG	102kHz	1600 x 1200@80Hz	\$699
VisionMaster 450 (18.0" VIS)	TCO '95	0.26mm/dp	102kHz	1600 x 1200@80Hz	\$599
17" VisionMaster Pro 400 (16.0" VIS)	TCO '95	0.25mm/AG	96kHz	1600 x 1200@75Hz	\$499
VisionMaster 400 (16.0" VIS)	TCO '95	0.26mm/dp	96kHz	1600 x 1200@75Hz	\$439
STO28T (16.0" VIS)	TCO '95	0.28mm/dp	96kHz	1280 x 1024@85Hz	\$399
15" VisionMaster 300 (13.7" VIS)	MPR-II	0.28mm/dp	89kHz	1280 x 1024@65Hz	\$219



iiyama



For the name of your local dealer call: (800) 394-4335 • www.iiyama.com

© 1998 iiyama North America, Inc. All rights reserved. iiyama, the iiyama logo, and the RSVP logo are trademarks of iiyama North America, Inc. All other trademarks are the properties of their respective owners.
Estimated Street Price is shown. actual price may vary. Prices do not include shipping, handling and any applicable taxes. Specifications are subject to change without notice.
For more information, please write us at 575 Anton Blvd., Suite 590, Costa Mesa, CA 92626 800/394-4335, 714/437-5111; Fax: 714/437-5982



Perfect Five-Star Rating
January 1998
VisionMaster Pro 500



Perfect Five-Star Rating
November 1997
VisionMaster Pro 17



January 6, 1998
VisionMaster Pro 17



Performance & Technical Excellence
March 1997
VisionMaster Pro 21



Six Time Winner
Jan 1997, Feb 1997, March 1997,
April 1997, May 1997, June 1997
VisionMaster Pro 21



October 7, 1997
VisionMaster Pro 17
October 5, 1998
VisionMaster Pro 17



September 1998
VisionMaster Pro 502



Twelve Time Winner
July 1996, Jan 1997, March 1997, July 1997,
Sept 1997, Jan 1998, March 1998,
May 1998, July 1998, Sept 1998
VisionMaster Pro 17
April 1998, August 1998
VisionMaster 450

Choose 084 at www.pcmag.com/infolink



Windows CE, Round 3

Jupiter finally rises: The long-awaited larger Windows CE devices add productivity options, bigger screens, and alternative pointing devices.

By Bruce Brown

Microsoft has finally announced the much-rumored new version of Windows CE, code-named Jupiter. Officially known as Windows CE Handheld PC Professional Edition (or H/PC Pro), this latest release improves Windows CE's communications potential, adds applications, and most significantly—expands the hardware reference design for hand-held computers.

The previous hardware reference designs included the features of the original Windows CE 1.0 Handheld PC (H/PC) and Windows CE 2.0's expanded H/PC capabilities, plus the addition of the palm-size PC specification. The new H/PC Pro platform uses Windows CE 2.11 as the operating system and allows supersize hand-held units, which some people may

(understandably) confuse with subnotebook PCs.

Windows CE 2.0 added color display and limited printing capability to H/PCs, but the H/PC 2.11 platform now gives hardware partners greater design flexibility. Under the new reference design, the device size can vary from small (like the current HP 660LX) and medium (like the NEC MobilePro 750C) to large (like the HP, Sharp, and Vadem models reviewed here).

Monochrome and 256-color displays are supported with 480-by-240, 640-by-240, 640-by-480, and 800-by-600 resolutions. Touch screens are still supported, but they're not required; hand-helds can use other pointing technologies, such as mice, touch pads, and TrackPoint-like devices. Storage and connection options include USB, Compact Flash, PC Card, and Fast IR.

Software enhancements in Windows CE 2.11 include a new e-mail client with IMAP4 support and improved POP3 features, upgrades to existing applications such as on-device converters for Pocket Excel and Pocket Word (so you can work with Excel and Word files without having to convert them on a host PC first), editable Pocket PowerPoint slide notes (but no slide creation or editing), and new views in Pocket Outlook. Two new applications are Pocket Access and Microsoft InkWriter, the latter a handy notetaker that accepts typed text, drawings, and handwriting.

Most Windows CE 2.0 software will likely run on the new devices. At publication time, Bsquare (publisher of bFAX, bFIND, and a raft of other Windows CE applications) and Paragraph (publisher of the

POWER TO THE PEOPLE

Adobe beefs up Illustrator 8.0's drawing tools to please professional artists and at the same time makes them more accessible to first-time users. *Page 52.*



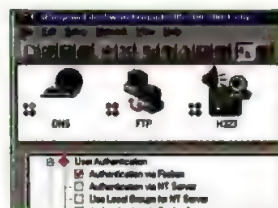
LATEST AND GREATEST

New notebooks from IBM and Toshiba for the savvy mobile professional. *Page 60.*



SECURITY BOX

The WatchGuard Technologies' Security System v3.1 with Firebox II delivers easy-to-use network security that anyone can handle. *Page 76.*



More Products Reviewed

FileMaker Pro 4.1.....	48
Lexmark Photo	
Jetprinter 5770.....	51
WinZip 7.0.....	52
HoTMetal PRO 5.0.....	56
McAfee VirusScan 4.0.....	56
Poser 3.....	64
Norton 2000 Corporate Edition.....	66
Sony GDM-F500.....	66
VoiceCrypt 2.01.....	73
MemberSites.....	73
MultiTech MultiModem USB.....	75
Intel ProShare	
Video System 500.....	77

First Looks Online

For daily just-in-time reviews of shipping products, check out First Looks Online at:

www.pcmag.com

handwriting software Calligrapher) had announced support for the new platform.

By adding relatively big-screen capability to the Windows CE hand-held platform, Microsoft has made it easier for OEMs to incorporate and promote document creation and editing and presentation applications and features with their new devices. Larger-format devices with 640-by-480 and 800-by-600 displays may compete with some notebook or subnotebook lines, but the lack of hard disks, significant memory restrictions, and limited application support should help with differentiation.

The advantages of the H/PC Pro compared with conventional portable PCs continue to be smaller size, instant power-on, and longer battery life. And because Windows CE devices have fewer moving parts, they're more durable.

Microsoft has announced that Casio, Compaq, Everex, Fujitsu, Hewlett-Packard, Hitachi, LG Electronics, NEC, NTS Computer Systems, Samsung, Sharp, and Vadem are OEMs supporting H/PC Pro. As of publication, only HP, LG,

Sharp, and Vadem have announced specific H/PC Pro devices (in LG's case, via an upgrade). HP, Sharp, and Vadem expect to ship devices during November, and the LG upgrade will be available before the end of the

AND COMING SOON...

More H/PC Pro vendors will join HP, Sharp, and Vadem in the near future. The LG Phenom Express (\$899 list, 800-243-0000, www.lgphenom.com, 427 at www.pcmag.com/infolink) is

ON DECK: The NEC MobilePro 800 (left) and the LG Phenom Express.



year. NEC plans to ship two models in January 1999.

For this roundup, we tested near-final versions of the HP Jornada 820, Sharp Mobilon TriPad, and Vadem Clio. LG provided a Pro-ready Windows CE 2.0 device, the LG Phenom Express CE 2.0, and NEC let us handle an early version of the new MobilePro 800.

a half-VGA Windows CE 2.0 model from LG Electronics with full-size parallel and VGA ports. The unit is user-upgradable to H/PC Pro via a ROM upgrade. NEC Computer Systems (888-863-2669, www.necnow.com, 428 at www.pcmag.com/infolink) will have two H/PC Pro models, the NEC MobilePro 770 with a half-VGA display (\$800 street) and the MobilePro 800 with an

800-by-600 SVGA display (\$1,000 street). IBM has stated support for the Windows CE platform, particularly H/PC Pro, and plans to show enterprise-focused samples to customers but will not ship products before 1999.

The LG Phenom Express, powered by a 100-MHz Hitachi SH3 CPU, ships with 32MB of RAM and an internal 56K V.90 modem. The convenient full-size printer and external monitor ports are revealed behind the battery compartment at the back of the 31-ounce (with a 12-hour rated lithium ion battery pack), 1.1-by-9.2-by-5.6-inch hand-held.

The Phenom Express has 16.5-mm key spacing, and its 640-by-240 resolution touch screen measures 8.2 inches diagonally. A capable H/PC with the ROM upgrade, the Phenom Express will be a good choice as a convenient notetaker and communications device if the ROM upgrade doesn't cost more than \$100.

We liked what we saw during our brief hands-on experience with a running preproduction version of the NEC MobilePro 800. The NEC's 9.4-inch diagonal, 800-by-600 resolution touch

Which to Choose: Notebook, Subnotebook, or H/PC Pro?

The H/PC Pro platform is likely to cause many potential buyers to compare the devices to conventional notebook computers and subnotebooks. Now that you can buy a full-size notebook or a subnotebook for the average price (\$1,000) of the H/PC Pros, features and design elements can determine which size best meets your needs.

The WinBook XL 233/16 (\$999 via the Internet, www.winbook.com; or \$1,199 by phone, 800-254-7806; 425 at www.pcmag.com/infolink) includes a 233-MHz Pentium CPU, 16MB of RAM (expandable to 128MB), a 1.6GB hard disk, internal CD-ROM and floppy disk drives, and a 12.1-inch dual-scan 800 by 600 display. The 7.8-pound WinBook has a 2- to 3-hour rated nickel hydride battery and measures 2 by 12.2 by 9.8 inches (HWD). The system includes typical notebook ports and slots, 17-mm key spacing, and a touch pad. An excellent value, the WinBook XL is fine if you don't mind its weight and bulk, battery life, or its power-on time.

The Toshiba Libretto 70CT (\$1,000 street, 888-598-7802, computers.toshiba.com, 426 at www.pcmag.com/infolink)

has a 120-MHz Pentium MMX CPU, 16MB of RAM (expandable to 32MB), and a 1.6GB hard disk. The 70CT's 8.1-inch viewable TFT display runs at 640-by-480, and the lithium ion battery is rated for 1 to 2 hours. The 1.9-pound Libretto measures 1.4 by 8.3 by 4.5-inches (HWD) and has a 15-mm key spacing. Compared with the H/PC Pros, the Libretto has extremely limited battery life, a tiny keyboard, and a smaller display. The Libretto has appeal because it can run a full version of Windows as well as most applications, but it isn't a good candidate to use all day as you travel.

The advantages of the H/PC Pro are instant-on access, extended battery life, and no spinning hard disk that might potentially fail. The H/PC Pros can run independently, but they are primarily intended as companion devices to PCs, with easy file synchronization and backup. H/PC Pros don't have hard disks (yet) and won't run most Windows applications, but if you have a PC and want a portable device, the Windows CE format is a great choice.

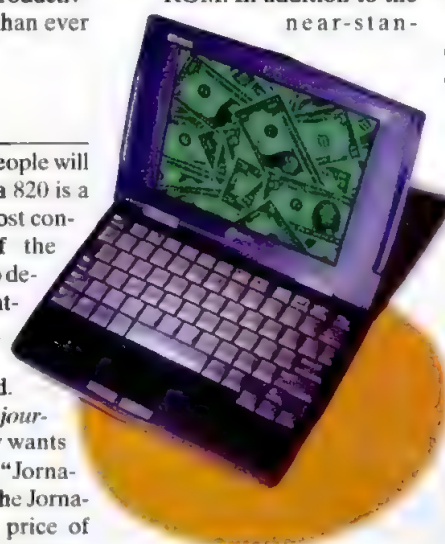
screen was very bright—the higher resolution significantly expands screen content—and its 17.5-mm key spacing leads the field. There are slots and ports galore, including a CompactFlash slot, PC Card slot, Kensington security slot, and ports for serial, VGA, IR, and USB connections, as well as an RJ-11 jack for the 56K internal modem.

The NEC MobilePro 770 will have a 640-by-240 VGA screen and the same key-spacing, modem, and interfaces. Both devices will have 133-MHz NEC MIPS CPUs and come standard with 16MB of RAM, expandable to 48MB. NEC had good success with the MobilePro 750C and is following handily with the 770 and 800 models.

With hand-held computing devices ranging from the tiny REX PRO PC-Card Organizer to the ever-popular and still-reigning 3Com Palm devices, and the now more diverse Windows CE platforms, users who can figure out exactly which design they need have more choices for portable productivity and connectivity than ever before.

HP Jornada 820

At first glance most people will think the HP Jornada 820 is a subnotebook. This most conventional-looking of the first wave of H/PC Pro devices looks like a slightly underfed notebook; it has a clamshell design and a touch pad. *Jornada* is Spanish for *journey*, but the company wants you to pronounce it "Jornada," not "Hornada." The Jornada's expected street price of \$1,000 includes a 56K V.90 internal modem. If you prefer a touch pad to a touch screen and want a conventional notebook-style design, the Jornada 820 is a likely candidate with an unexpected name.



standard Type II CompactFlash and PC Card slots, the Jornada 820 has a USB port and XVGA-out for connection to an external monitor.

The 1.3- by 9.5- by 6.8-inch

(HWD) Jornada 820 weighs 2 pounds 10 ounces with the 10-hour-rated lithium ion battery installed and 3 pounds 4.4 ounces if you add the AC adapter. The QWERTY keyboard's layout, which has 17-mm key spacing, is broad enough that many people will feel comfortable using the Jornada 820 for moderate typing or data entry. A series of task keys are located in the top row of the keyboard as well.

The 8.2-inch-diagonal 256-color 640-by-480 display was clear on the test model, and the

HP Jornada 820

Street price: \$1,000
Hewlett-Packard Co.,
Palo Alto, CA; 800-443-1254
www.hp.com/handheld
421 at www.pcmag.com/infoclink

touch pad action was smooth and responsive. The display measures 5 inches wide and 6.6 inches high. Not having a touch screen on a Windows CE device took some getting used to, but the additional resistive layer required for a touch screen adds to the cost and dims the screen slightly.

The Jornada 820's AC, CompactFlash, and serial ports are on the right edge; the PC Card slot and a ROM upgrade slot are on the left; and the XVGA, USB, infrared, and RJ-11 ports,

as well as a Kensington security slot, are on the back of the device. The unit's speaker and microphone are located on the palm rest.

In addition to the standard Windows CE software, HP includes Sierra Imaging's Image Editor CE (see the sidebar "Image Expert CE—a Defining Digital Tool for Windows CE") and HP Jornada Viewer for searching for data across PIM applications. Bundled software includes LandWare's OmniSolve and Bsquare's bFAX Pro and bFIND. HP TopTools Agent is also included for system management for the DMI-compliant Jornada 820. REX and REX PRO users will also be able to use the bundled TrueSync CE 2.0 for plug-and-play synchronization of Pocket Outlook data.

The Jornada 820 kit includes two 3V backup batteries, the 10-hour standard lithium ion battery, and AC adapter, and a serial PC synchronization cable. Options include extended-life batteries (\$189), CompactFlash memory cards, RAM upgrades (16MB, \$79), and parallel and printer cables (\$49).

Jornada is the new brand for the HP Windows CE hand-held line. The familiar shape and user interface of the Jornada 820 should ease its acceptance in corporate applications.

SUMMARY OF FEATURES

Windows CE H/PC Pro Systems

	HP Jornada 820	Sharp Mobilon TriPad	Vadem Clio
Price	\$1,000 street	\$999 list	\$999 list
Processor/speed	Intel StrongARM SA-1100 / 190 MHz	NEC MIPS VR4111 / 84 MHz	NEC MIPS VR4111 / 84 MHz
Standard/maximum RAM	16MB / 32MB	16MB / 32MB	16MB / 32MB
Dimensions (HWD in inches)	1.3 x 9.5 x 6.8	1.3 x 11.3 x 8.6	1.3 x 11.3 x 8.6
Weight with battery (pounds)	2.6	3.3	3.3
Display resolution	640 x 480	640 x 480	640 x 480
Display height by width/diagonal (inches)	5.0 x 6.6 / 8.2	5.6 x 7.6 / 9.4	5.6 x 7.6 / 9.4
Battery type/rated hours	Lithium ion / 10	Lithium ion / 12-16	Lithium ion / 12
Modem type/speed	Internal / 56 Kbps (V.90)	Internal / 33.6 Kbps	Internal / 33.6 Kbps
Pointing device	Touch pad	Touch screen	Touch screen
Ports	Infrared, RJ-11, serial, USB, XVGA-out	Infrared, RJ-11 serial	Infrared, RJ-11 serial
Device interfaces	1 CompactFlash II slot, 1 Type II PC Card slot	1 CompactFlash II slot, 1 Type II PC Card slot	1 CompactFlash II slot, 1 Type II PC Card slot

Sharp Mobilon TriPad and Vadem Clio

It's a reasonable guess that if the HP Jornada 820 will win converts because of its conventional styling, then the Sharp Mobilon TriPad and Vadem Clio (which are virtually identical) will attract attention—and buyers—because they each strike a bold new figure.

These new H/PC Pro machines (which should be shipping by the time you read this) will both have list prices of \$999. With 9.4-inch-diagonal 640-by-480 256-color touch-screen displays, internal 33.6-Kbps modems, and transformer-like flexibility, the TriPad and Clio combine cool, rugged design with genuine functionality.

This joint effort between Sharp and Vadem combines Vadem's 15-year history of mobile-product design and development with Sharp's interna-

tional marketing and distribution presence. Both companies are licensees of H/PC Pro, and each will sell its device separately. The only differences



between the two products will be their colors and add-on software.

The TriPad and Clio are powered by 84-MHz NEC MIPS VR4111 RISC processors, with 16MB of RAM standard (expandable to 32MB). They have a

remarkably flexible design: The articulated display-support arms attached to the bottom section and to the middle sides of the display let you position the screen as a conventional display or fold the screen down over the keyboard for travel. You can also flip the screen over to use it as a tablet, or you can turn it around

Sharp Mobilon TriPad

List price: \$999

Sharp Electronics Corp.,
Mahwah, NJ; 800-237-4277

www.sharp-usa.com

422 at www.pcmag.com/infolink

so you can sit behind the keyboard and have viewers seated in front of you see the screen.

If you want to sit in a meeting and take notes, use the display tablet-style; to type a report, position the screen like a conventional notebook's; for presentations, flip the screen like an easel. Although we didn't take an airplane ride for confirmation, you could probably position the full-size screen for use on a coach-class tray table with-

out the usual concern that the person sitting in front of you will move the seat back suddenly and crush it.

Both products are a bit hefty at 3 pounds 4 ounces with battery and 3 pounds 7 ounces if you add the included AC adapter. Vadem rates the standard lithium ion battery at 12 hours, and Sharp cites 12 to 16 hours; usage will determine actual performance, so your mileage may vary. The body of each unit is about 1 inch thick when closed, but the hinge at the back, which holds the battery, bulges a bit to produce a thickness of 1.3 inches. Closed, the unit is 11.3 inches wide and 8.6 inches deep.

The display measures 5.6 inches high by 7.6 inches wide. The keyboard is curved slightly (as if the rows of keys are smiling at you), and key spacing is 16.5 mm, comfortable for moderate typing. Because the device uses a touch screen, there's no need for a separate touch pad, pointing stick, or trackball.

The microphone and power

Image Expert CE—A Defining Digital Tool for Windows CE

Sierra imaging's Image Expert CE (\$50 download) might be a "killer app" for the Windows CE H/PC Pro platform—at least in digital imaging circles. Image Expert CE is significant as a digital image manager, editor, and presentation engine, taking advantage of the platform's display size and resolution and its support of external monitors.

Image Expert CE works with BMP and JPG image files, which you can transfer directly by serial cable from Agfa, Epson, Olympus, and Sanyo digital cameras or by CompactFlash or SmartMedia cards. If your digital camera uses SmartMedia, you'll need to use a PC Card adapter to transfer images. You can also transfer and even synchronize image files stored on a host PC.

In Browser View the screen's left side shows the CE folder directory, and the right side displays image thumbnails for the selected folder. You can create

PIX: Image Expert CE takes advantage of the H/PC Pro's bigger screen size.



albums in Browser View and drag and drop images to manage album content. In Image View the thumbnails are shown on the left, and the selected image on the right, with support for image zooming, panning, and scrolling.

In Information View you can annotate an image. You can also use the hand-held's voice recorder to enter WAV file notes. Another handy feature is the ability to use digital ink to write directly on images; ink annotations can be kept separate from images or permanently blended.

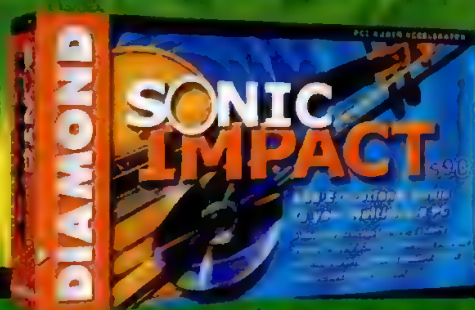
Once you have images on the device organized and annotated, you can view them one at a time or in a slide show,

using either the Windows CE device or an external monitor. Image Expert is only the second program (Pocket PowerPoint is the other) able to use external video-out with H/PCs, thereby extending the platform's capacity for portable presentations.

Image Expert CE. Direct price: download, \$50; with CD and manual, \$70. Requires: Microsoft Windows CE 2.0 or later; 1.5MB H/PC RAM, host PC running Windows CE Services 2.0 or later; Sierra Imaging Inc., Scotts Valley, CA; 877-448-2493, 408-481-2070; www.sierraimaging.com; 424 at www.pcmag.com/infolink

GET OVER 1 MILLION WAVETABLE SOUNDS FOR JUST \$49

[Hey, that's only \$.000049 per sound.]



Sonic Impact 590. True PCI Audio Made Affordable.

SONIC IMPACT KNOCKS OUT THE COMPETITION

	DIAMOND SONIC IMPACT 590	CREATIVE LABS SOUNDBLASTER PCI64
NUMBER OF DIRECTSOUND STREAMS SUPPORTED IN HARDWARE*	48 STREAMS	NONE
NUMBER OF DIRECTSOUND 3D STREAMS SUPPORTED IN HARDWARE**	8 STREAMS	NONE
POSITIONAL 3D SUPPORT	A3D, DIRECTSOUND 3D	DIRECTSOUND 3D
WAVETABLE VOICES	64	64
WARRANTY	3 YEARS	1 YEAR
PRICE***	\$49	\$69

* Each CD-quality DirectSound stream carries an orchestra of sounds simultaneously. With Sonic Impact, all 48 streams are processed on-board, unlike other sound cards that rely heavily on the CPU. Number of streams tested with DSShow 3D.

** Each DirectSound 3D stream can be positioned independently around your head creating a sense of wrap-around realism that greatly enhances your multimedia experience.

*** Suggested retail price.

A3D Now bring all of the sounds of multimedia to your ears without paying through the nose. Diamond's Sonic Impact 590 is the PCI audio card that kicks in 48 CD-quality hardware streams, so you'll hear the full palette of sound in true clarity at any volume. Based on Aureal's™ award-winning Vortex technology, the Sonic Impact 590 now provides incredible A3D™ positional 3D audio and 64-voice wavetable support to uncork the cutting-edge DirectSound and DirectSound 3D that's built into your Windows® software. So games sound more real, and all of your multimedia truly comes to life. You can also mix audio, download music from the Internet, create MP3 files, and program sound effects in 16-bit, full duplex stereo audio. With Sonic Impact, you're assured of comprehensive support for DOS, Windows 95/98 and Windows NT operating systems.

It's the ultimate price and performance value in PC audio today. Get Sonic Impact 590 and get millions of voices, notes, and sound effects—all for the price of a song.



Accelerate your world.

Enter the Sonic Impact Sweepstakes by visiting our website at <http://www.diamondmm.com/sonicimpact>

SITUATION:

"Interleaf needed plenty of configuration options – and most importantly, total reliability"

— Senior Network Support Engineer,
Interleaf

Build
Your Own at
SAGELEC.COM



NEW!

SAMPLE WORKSTATIONS – ALL SYSTEMS CUSTOM BUILT

CAD STATION

- Qx(1) Intel Slot 2 XEON 450MHz Processor
- 512KB Cache, Upgradable to 2 CPUs
- 128MB SDRAM Expandable to 2GB
- Slots: (6) PCI, (1) ISA, (1) AGP
- Integrated:
 - Sound & Ethernet 10/100 by Intel
 - #9 Revolution 4 32MB AGP
 - Qx(1) 9GB 10,000RPM 10,000RPM (5 Dims) Removable HD
 - Sony 32x CD-ROM; Keyboard, Floppy, Mouse
 - AMI U2 RAID 0-5 Controller
 - Tower Case 300 Watts

\$3550

Accel Graphics GMX 2000 96GB Solution 5700

POWER STATION

- 1 Intel Pentium II 450MHz Processor
- 512KB Cache, Upgradable to 2 CPUs
- 64MB SDRAM
- Slots: (5) PCI, (2) ISA, (1) AGP BX Chipset
- 9GB 7200 RPM Ultra IDE 39140A
- Sony 32x CD-ROM
- NEW! Diamond N Video 16MB TNT AGP Video
- Keyboard, Floppy, Mouse
- Mid-Tower Chassis

\$1750

9GB U2 10,000RPM Solution 2470

Raid Upgradable

- Qx(1) Intel Slot 2 XEON 400MHz Processor
- 512KB Cache, Upgradable to 2 CPUs
- 128MB SDRAM Expandable to 2GB
- Slots: (6) PCI, (1) ISA, (1) AGP
- Integrated:
 - Sound & Ethernet 10/100 by Intel
 - #9 Revolution 4 32MB AGP
 - IBM 14GB 7200 RPM Ultra 33 IDE Drive
 - Sony 32x CD-ROM; Keyboard, Floppy, Mouse
 - Tower Case 300 Watts

\$2433

Accel Graphics Galaxy 52GB Solution 4399

- 1 Intel Pentium II 266MHz Processor
- 512KB Cache
- 32MB SDRAM

Integrated:

- Creative Labs PCI Sound
- 8MB N Video 128 AGP Video
- 4GB Ultra 33 HD
- Slots: (4) PCI, (4) ISA
- Sony 32x CD-ROM; Keyboard, Floppy, Mouse
- Surround Sound Speakers
- Windows 98
- Desktop Chassis
- Intel Landesk Client Manager

\$872

NETWORKING – CALL FOR YOUR CUSTOMIZED SOLUTION



WE NOW OFFER INTEL'S COMPLETE LINE OF NETWORKING SOLUTIONS

Pro 100 LAN Adaptors

Gigabit Pro 1000 Adaptors

Hubs

Switches

Routers

Some options available. Features may be subject to retooling fees. RMA # must be acquired. Some devices have not been approved by the Federal Communications Commission. These devices are not, and may not be, offered for sale to lease, or sold or leased until the approval of the FCC has been obtained.

GSA Schedule: GS-35F-3103D



SAMPLE SERVERS – ALL SYSTEMS CUSTOM BUILT

NEW!

NEW!



- Q:(2) Intel Xeon 400Mhz Processor
- 1MB Cache, Expandable to 4 CPUs
- 256MB RAM Expandable to 8GB
- Slots: (12) PCI (2 hotpluggable) (2) ISA
- Integrated 2MB Video
- Q:(3) 18GB 10,000 RPM LVD HD
- 3 Channel LVD Raid Controller w/ 32MB Cache
- System Management on Board that monitors:
- Performance, Hardware, DMI
- Remote Access Monitoring System
- 12 Bay Q:(3) 600 Watt Redundant Power Supplies, Tower or Rackmount Case

CALL FOR PRICING

- 1 Intel Xeon 400Mhz Processor
- 512KB Cache, Upgradeable to 2 CPUs
- 128MB ECC Memory, Expandable to 2GB
- Slots: (6) PCI, (1) ISA, (1) AGP
- Integrated 10/100 Ethernet
- Matrix G200 8MB AGP
- 1 Channel LVD Raid 5 Controller w/ 16MB Cache
- Q:(3) 9GB 10,000RPM LVD (5.0ms) Remov. HD
- Sony 32x CD-ROM, Keyboard, Floppy, Mouse
- Tower Chassis 300 Watt Power

\$5089

RAID MOUNT SOLUTION AVAILABLE

- 1 Intel Pentium II 400Mhz Processor
- 512KB Cache, Upgradeable to 2 CPUs
- 128MB SDRAM Memory, Expandable to 2GB
- Slots: (6) PCI, (1) ISA, (1) AGP
- Integrated Dual LVD Controllers
- Upgradeable LVD RAID Port
- 9GB 10,000 RPM LVD HD
- System Management on Board
- 8MB AGP Video
- Sony 32x CD-ROM, Keyboard, Floppy, Mouse
- Tower Case 300 Watt

\$2675

NEW SAMPLE RAID 5 SUBSYSTEMS



- 2 Channel RAID U/W Controller
- 8 Hot-Swappable Drive Bays
- 2-300 Watt N+1 Red. Power Supplies
- 32MB Cache
 - Internal Temperature Status
 - Power Supply Status
 - Cooling Fan Status
 - Visual and Audible Alarm

77GB Solution

- Q: (3) 9GB 7200RPM LVD HD: '6370

27GB Solution

- Q: (3) 9GB 10,000RPM (5.0ms) LVD HD: '6840

54GB Solution

- Q: (3) 18GB 10,000RPM LVD HD: '8351

- Active/Active Controllers
- Q: (2) 4 Channel RAID 5 U/W Controllers
- 8 - 230 Watt Hot Redundant Power Supplies
- 128MB of Cache
 - Internal Temperature Status
 - Power Supply Status
 - Cooling Fan Status
 - Visual and Audible Alarm

72GB Solution

- Q: (8) 9.1GB 7200RPM LVD HD: '18,750

72GB Solution

- Q: (8) 9GB 10,000RPM (5.0ms) LVD HD: '20,300

144GB Solution

- Q: (8) 18GB 10,000RPM LVD HD: '24,498

- 1 Intel Pentium II 450Mhz Processor
- 512KB Cache, Upgradeable to 2 CPUs
- 64MB SDRAM
- Slots: (4) PCI, (2) ISA BX Chipset
- Integrated Adapter U/W SCSI
- Integrated Intel 10/100 Ethernet
- Integrated 2MB Video
- AWI LVD RAID 5 Controller 1 Channel
- Intel Server Mgt Hardware
- Q:(3) 9GB LVD 7200 RPM HD
- Sony 32x CD-ROM, Keyboard, Floppy, Mouse
- Tower Chassis 300 Watt Power

\$4380

BUILD YOUR OWN AT WWW.SAGELEC.COM

3 YEAR LIMITED WARRANTY • 1ST YEAR ON-SITE FOR MULTI PROCESSING SYSTEMS

SOLUTION:

“I made the call.”

1-800-989-3475

8:30am - 7:00pm EST

Choose 309 at www.pcmsg.com/infolink

www.sagelec.com

790 Turnpike Street • North Andover, MA 01845 • Fax 978.689.0180

**SAGE
ELECTRONICS**
Total Solution Company



FIRST LOOKS

switch are located on the right side of the screen. Other ports and compartments are on the base unit, with the AC, serial, infrared, and RJ-11 jack on the left side and the PC Card slot on the right. The only odd design element is that you have to remove the battery to insert a CompactFlash card, a significant inconvenience if you use more than one CF card.

Even after the initial novelty of the Clio and TriPad wore off, the units continued to be fun to use. Perhaps more important, their flexibility adds to their functionality, a factor particularly noticeable when trying differ-



Finder Utility. Calligrapher is particularly useful when using Microsoft's new InkWriter, which senses a handwriting recognition engine and makes using the Clio in tablet mode a

Vadem Clio

List price: \$999

Vadem

San Jose, CA; 408-467-2100

www.vadem.com

423 at www.pcmag.com/infolink

natural extension of the device.

Sharp's software bundle includes Sharp's own PC File Viewer, Bsquare's backup utility bUseful, Citrix ICA Client, and Proxim Driver for Wireless LAN PC Card. Sharp intends the TriPad for business users, particularly those who make

mobile presentations.

Sharp will also ship the Mobilon Pro at approximately the same time as the TriPad. Also an H/PC Pro machine, it has a more conventional clamshell design, an 8.2-inch color touch screen, an internal 33.6-Kbps modem, and an \$899 list price. The Mobilon Pro is targeted at mobile professionals and college students. We didn't get a chance to test out the this machine.

Likely to show up on magazine covers and on the shelves of high-ticket electronics stores because of their captivating design, the Sharp Mobilon TriPad and Vadem Clio will win converts in many areas because of their versatility. It doesn't hurt that they're also very cool. **PC**

Publish Databases Online

Version 4.1 of FileMaker Pro adds ODBC compatibility and fixes a multitude of bugs.

By Stephen W. Plain

Amid stiff end-user database competition, FileMaker Pro has endured because of its uniquely approachable interface and reliable cross-compatibility with Macintosh workstations. Version 4.1 (\$199 list) adds only a minimal number of new features to this venerable product but includes fixes for over 200 bugs. FileMaker Pro remains the quickest and easiest way to publish databases to the Web.

The primary addition to this version of FileMaker Pro is ODBC compatibility, an important feature missing from previous releases, which allows you to import data from ODBC sources. A new ODBC SQL Query dialog screen lets you retrieve data from ODBC sources—both local and remote—without SQL programming expertise. Although this crucial new feature is implemented consistently with FileMaker's excellent import screens, we found the SQL Query dialog to

be a departure from the product's user-friendly nature.

We were able to build SQL queries against ODBC sources via point and click and edit the SQL directly. We found no SQL syntax help either in the dialog or in the online help, however. This new screen also lacked context-sensitive help to guide us through the added features.

FileMaker Pro 4.1 comes with 30-day trial versions of Intersolv's Microsoft SQL Server, Microsoft Access 95/97, Excel, text file ODBC client drivers, and Oracle 7. But for permanent connectivity, you'll have to provide your own client drivers or purchase them from Intersolv.

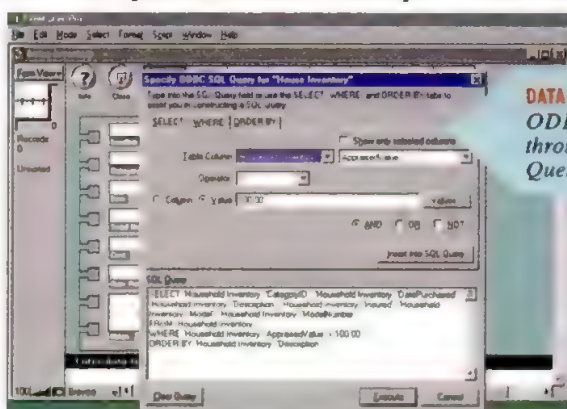
Other additions include runtime support for a few features found in the company's Developer Edition of the product. You can now run databases that

use full-screen kiosk mode and custom menus in FileMaker Pro. But you can only implement these features from the Developer Edition.

You can instantly "publish" your FileMaker Pro databases to an intranet or the Web by simply enabling the product's Web Companion add-in. The product contains its own simple

Maker Web hosting providers on its Web site, the company does not include any of the top-tier ISPs.

This upgrade's ODBC compatibility plugs one of the program's persisting holes. Although you can import only data from ODBC sources—and not directly update it—this new feature lets desktop users take snapshots of enterprise data and



DATA: FileMaker Pro 4.1 adds ODBC import capability through the new ODBC SQL Query dialog.

work with them locally or in small workgroups.

For quick and not-so-dirty exposure of databases across your intranet, File-

Maker Pro 4.1 presents a simple and cost-effective solution. **FileMaker Pro 4.1.** List price: \$199. Requires: 8MB RAM, 40MB hard disk space, Microsoft Windows 95, 98, NT, or Windows for Workgroups. FileMaker Inc., Santa Clara, CA; 800-986-2249; www.filemaker.com; 431 at www.pcmag.com/infolink.

Keep in mind, however, that your host system must be running FileMaker Pro and support these extensions. Although FileMaker has a lengthy list of File-



**We can custom-build a gift for anyone.
(Not even the folks at the North Pole can claim that.)**

Finally something the entire family can share. (Besides the bathroom.)

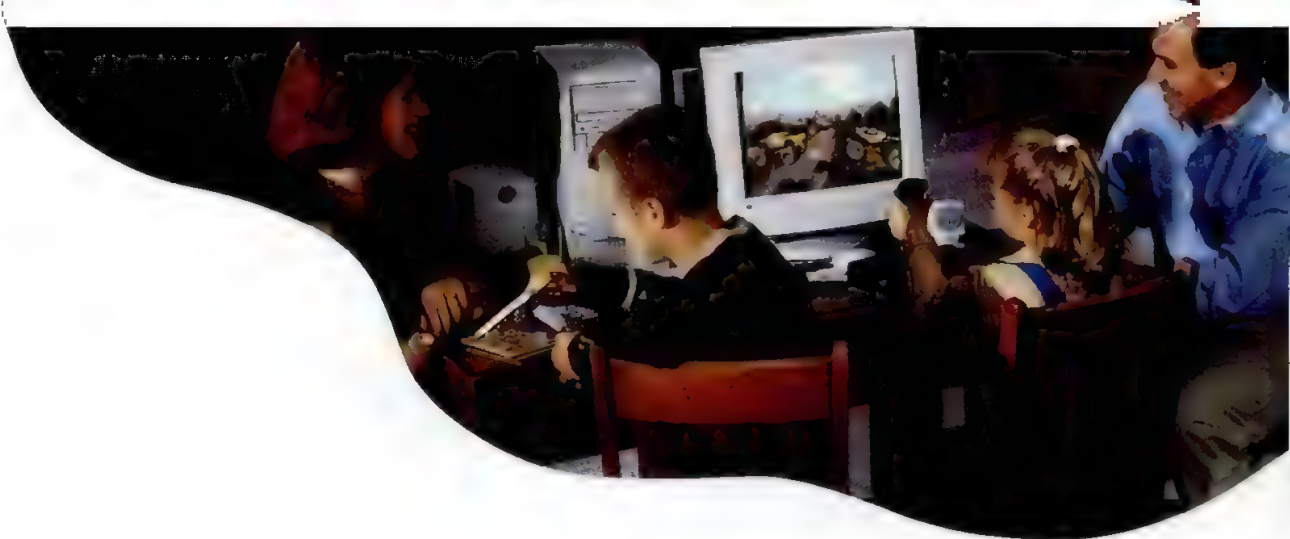


Just think: one gift that can make everyone happy. Let us build you a computer with hardware and software customized for every family member: the budget keeper, the gaming fanatic, the Internet surfer, etc. All it takes is a low monthly payment with no money down. And after two years, as your family grows, or just grows up, you have the option to trade your Gateway™ PC in toward the purchase of a new one¹. In the meantime, we'll always be standing by with flexible service and support, 24 hours a day, seven days a week, online, on-call or by fax. Now the only thing you need to worry about is who gets to use the computer first.



Let's talk about your **Gateway™**





Every Gateway client is unique, and so is every Gateway PC. These systems are just examples of what we can build for you. For even more options for customizing your PC, see the Software and Peripherals page.

The Family Foundation G6-350

- Intel® Pentium® II Processor 350MHz with 512K Cache
- 64MB SDRAM
- EV700 .28 Screen Pitch 17" Monitor (15.9" viewable)
- 8MB AGP Graphics
- 10GB Ultra ATA Hard Drive
- DVD-ROM Drive & MPEG2 Decoder
- 3.5" Diskette Drive
- SoundBlaster® AudioPCI™ 64D
- Boston Acoustics® BA635™ 3-Piece Speaker System
- U.S. Robotics® 56K Voice Winmodem
- Micro-Tower Case
- MultiFunction Keyboard & Mouse
- Microsoft® Windows® 98 & MS® Home Essentials™ Software
- Gateway Gold™ Service for G-Series PCs*

**As low as \$45/mo.
for 48 mos. or
\$1599****

Friend of the Family G6-450

- Intel Pentium II Processor 450MHz with 512K Cache
- 64MB SDRAM
- EV700 .28 Screen Pitch 17" Monitor (15.9" viewable)
- 16MB AGP Graphics
- 10GB Ultra ATA Hard Drive
- DVD-ROM Drive & MPEG2 Decoder
- 3.5" Diskette Drive
- SoundBlaster AudioPCI 64D
- Boston Acoustics BA635 3-Piece Speaker System
- U.S. Robotics 56K Voice Winmodem
- Mid-Tower Case
- MultiFunction Keyboard & Mouse
- MS Windows 98 & MS Home Essentials Software
- Gateway Gold Service for G-Series PCs*

**As low as \$56/mo.
for 48 mos. or
\$1999****

The Far-Flung Family SOLO® 3100LS (FireAnt)

- 12.1" SVGA TFT Color Display
- Intel Pentium II Processor 233MHz with 512K Cache
- 32MB SDRAM (expandable to 96MB)
- 2.5MB 256-Bit Graphics Accelerator
- Integrated DVD-II Drive
- Integrated V.90 Modem
- External 3.5" Diskette Drive
- 2GB Ultra ATA Hard Drive
- Lithium Ion Battery & AC Pack
- USB Port, CardBus & Zoomed Video Support
- Integrated 16-Bit Sound & Stereo Speakers
- Leather Portfolio Carrying Case
- Full-Size Keyboard
- EZ Point® Pointing Stick
- MS Windows 98 & MS Office 97, Small Business Edition plus Bookshelf® 98
- LapLink® V.7.5 for Windows 98 & McAfee® VirusScan
- Gateway Gold Service for Portable PCs*

**As low as \$70/mo.
for 48 mos. or
\$2499****

Add on specific packages to customize your Gateway PC to fit your family's needs.

- **Audio Entertainment** - Philips® CD-RW (CD-Rewritable) Drive, Boston Acoustics MediaTheater™ 3-Piece Speaker System **\$339**
- **Digital Photo Pack** - Epson® Photo PC™ 550 Color Digital Camera, Philips CD-RW **\$419**
- **Family Entertainment** - Kid's Backpack™ Software, Microsoft Action Titles, MS SideWinder® Precision Pro Joystick **\$249**

Internet access provided by gateway.net™ for \$14.95/mo.³

call 1-800-270-5732
www.gateway.com/yourware

*Call 1-800-GATEWAY or write to us at Gateway Terms & Conditions, P.O. Box 1951, North Sioux City, SD 57049-1951 for a free copy of our limited warranty, on-site service agreements, and installation agreements. If your Gateway technician determines an on-site visit is necessary, on-site service will be provided for product purchased and located in the continental United States, Alaska, Hawaii, Puerto Rico and Canada (excluding mice, keyboards, monitors and Solo portables). On-site and installation services are administered by PC Technology Services, Inc. See agreements for specific terms and limitations. **All prices and configurations are subject to change without notice or obligation. Prices do not include shipping and handling or any applicable taxes. Loan financing available on approved credit through independent lender. Payments based on 48-month term and an Annual Percentage Rate as low as 14.9%. Your APR may be higher. 2% access check fee (\$2min/\$15max.); not applicable to Gateway purchases.

Actually, there is a gift they won't be bored with by New Year's.



This holiday, give your kids a gift that won't end up in the back of the closet. We'll custom-build a Gateway™ PC for children of any age, even as young as preschool, with games and learning software, as well as special hardware like the kidBoard™ Keyboard. And as they get older, you can upgrade your Gateway system to match new interests and offer new challenges. In fact, with the Your:}Ware™ program¹, you have the option of trading your PC in toward the purchase of a new one after two years. Too bad you can't do the same with your kids' clothes.



Let's talk about your **Gateway™**





Every Gateway client is unique, and so is every Gateway PC. These systems are just examples of what we can build for you. For even more options for customizing your PC, see the Software and Peripherals page.

The Budding Scholar G6-333C

- Intel® Celeron™ Processor 333MHz with 128K Cache
- 32MB SDRAM
- EV700 .28 Screen Pitch 17" Monitor (15.9" viewable)
- 4MB AGP Graphics
- 3.2GB Ultra ATA Hard Drive
- DVD-ROM Drive & MPEG2 Decoder
- 3.5" Diskette Drive
- SoundBlaster® AudioPCI™ 64V
- Boston Acoustics® BA635™ 3-Piece Speaker System
- Telepath® 56K' Winmodem
- Micro-Tower Case
- MultiFunction Keyboard & Mouse
- Microsoft® Windows® 98
- & MS® Home Essentials™ Software
- Canon® Color Printer
- Gateway Gold Service™ for G-Series PCs*

**As low as \$42/mo.
for 48 mos. or
\$1499****

The Personal Tutor G6-400

- Intel Pentium® II Processor 400MHz with 512K Cache
- 64MB SDRAM
- EV700 .28 Screen Pitch 17" Monitor (15.9" viewable)
- 16MB AGP Graphics
- 10GB Ultra ATA Hard Drive
- DVD-ROM Drive & MPEG2 Decoder
- 3.5" Diskette Drive
- SoundBlaster AudioPCI 64D
- Boston Acoustics BA635 3-Piece Speaker System
- U.S. Robotics 56K' Voice Winmodem
- Mid-Tower Case
- MultiFunction Keyboard & Mouse
- MS Windows 98
- & MS Home Essentials Software
- Gateway Gold Service for G-Series PCs*

**As low as \$50/mo.
for 48 mos. or
\$1799****

Add on specific packages to customize your Gateway PC to fit your kids' needs.

- **Kid Start** - KidBuilder Preschool-Kindergarten Software & kidBoard Keyboard **\$139**
- **Grade School Advantage** - Family Reference Bundle, KidBuilder Grades 1-4, OR KidBuilder Grades 5-8 **\$169**

**Internet access provided
by gateway.net™
for \$14.95/mo.†**

call 1-800-270-5732
www.gateway.com/yourware

*Call 1-800-GATEWAY or write to us at Gateway Terms & Conditions, P.O. Box 1951, North Sioux City, SD 57049-1951 for a free copy of our limited warranty, on-site service agreements, and installation agreements. If your Gateway technician determines an on-site visit is necessary, on-site service will be provided for product purchased and located in the continental United States, Alaska, Hawaii, Puerto Rico and Canada (excluding mice, keyboards, monitors and Solo portables). On-site and installation services are administered by PC Technology Services, Inc. See agreements for specific terms and limitations. **All prices and configurations are subject to change without notice or obligation. Prices do not include shipping and handling or any applicable taxes. Loan financing available on approved credit through independent lender. Payments based on 48-month term and an Annual Percentage Rate as low as 14.9%. Your APR may be higher. 2% access check fee (\$2min./\$15max.), not applicable to Gateway purchases.

Speed, power and other holiday treats.



If you know someone (like yourself) who always insists on having the hottest technology, a Gateway™ PC can make the holidays happier. Gateway offers the new Pentium® II Xeon™ processor at 450MHz — the fastest on the market. And thanks to the Your:)Ware™ program¹, you'll always keep up with innovations. You put no money down, make low monthly payments, and then, after two years, you have the option to trade it in toward the purchase of a new (i.e., faster) PC. So put a Gateway computer at the top of your holiday wish list.



Let's talk about your **Gateway™**





Every Gateway client is unique, and so is every Gateway PC. These systems are just examples of what we can build for you. For even more options for customizing your PC, see the Software and Peripherals page.

Blast Off G6-450

- Intel® Pentium® II Processor 450MHz with 512K Cache
- 128MB SDRAM
- VX900 .26 Screen Pitch 19" Monitor (18" viewable)
- 16MB AGP Graphics
- 10GB Ultra ATA Hard Drive
- DVD-ROM Drive & MPEG2 Decoder
- 3.5" Diskette Drive
- **lomega® ZIP BUILT-IN™ Internal Drive**
- SoundBlaster® AudioPCI™ 64D
- Boston Acoustics® BA635™ 3-Piece Speaker System
- U.S. Robotics® 56K² Voice Winmodem
- Mid-Tower Case
- MultiFunction Keyboard & Mouse
- Microsoft® Windows® 98 & MS® Home Essentials™ Software
- Gateway Gold™ Service for G-Series PCs*

**As low as \$70/mo.
for 48 mos. or
\$2499****

Hyperspace GX-450XL

- Intel® Pentium® II Xeon™ Processor 450MHz with 512K Cache
- 128MB SDRAM
- VX900 .26 Screen Pitch 19" Monitor (18" viewable)
- 16MB nVidia® RIVA TNT™ AGP Graphics
- TV/FM Tuner Card
- 16GB Ultra ATA Hard Drive
- DVD-ROM Drive & MPEG2 Decoder
- Philips® CD-RW (CD-Rewritable) Drive
- 3.5" Diskette Drive
- SoundBlaster AudioPCI 64D
- Boston Acoustics Digital MediaTheater™ 3-Piece Speaker System
- U.S. Robotics 56K² Voice Winmodem
- Tower Case
- MultiFunction Keyboard & Mouse
- MS Windows 98 & MS Choice Software
- Gateway Gold Service for G-Series PCs*

**As low as \$112/mo.
for 48 mos. or
\$3999****

The Portable Desktop SOLO® 9100XL

- 14.1" XGA TFT Color Display
- Intel Pentium® II Processor 300MHz with 512K Cache
- 128MB SDRAM (expandable to 192MB)
- 4MB SGRAM 3-D Graphics Accelerator
- Removable Combo DVD-II Drive & 120MB SuperDisk™ Drive
- 8GB Ultra ATA Hard Drive
- Two Lithium Ion Batteries & AC Pack
- Two USB Ports, CardBus & Zoomed Video Support
- NTSC/PAL Video Input & Output
- 16-Bit Wavetable Sound & Altec Lansing® Speakers
- V.90 56K² Windows Modem
- Deluxe Leather Case
- Port Replicator
- EZ Pad® Pointing Device
- External Battery Charger
- MS Windows 98 & MS Office 97, Small Business Edition plus Bookshelf® 98
- LapLink® V.7.5 for Windows 98 & McAfee® VirusScan
- Gateway Gold Service for Portable PCs*

**As low as \$114/mo.
for 48 mos. or
\$4099****

Add on specific packages to customize your Gateway PC to fit your needs.

Complete Gamers - Voodoo2™ Card with Extreme Gaming I & II (content suitable for ages 17 and older), MS SideWinder® Precision Pro Joystick \$399

Internet access provided by gateway.net™ for \$14.95/mo.†

call 1-800-270-5732
www.gateway.com/yourware

*Call 1-800-GATEWAY or write to us at Gateway Terms & Conditions, P.O. Box 1951, North Sioux City, SD 57049-1951 for a free copy or our limited warranty, on-site service agreements, and installation agreements. If your Gateway technician determines an on-site visit is necessary, on-site service will be provided for product purchased and located in the continental United States, Alaska, Hawaii, Puerto Rico and Canada (excluding mice, keyboards, monitors and Solo portables). On-site and installation services are administered by PC Technology Services, Inc. See agreements for specific terms and limitations. **All prices and configurations are subject to change without notice or obligation. Prices do not include shipping and handling or any applicable taxes. Loan financing available on approved credit through independent lender. Payments based on 48-month term and an Annual Percentage Rate as low as 14.9%. Your APR may be higher. †2% access check fee (\$2min./\$15max.); not applicable to Gateway purchases.

And don't forget some cyber stocking stuffers.

We don't just make customized computers. We also help people get more out of the ones they already have. Choose from our huge list of software bundles designed for everyone from serious gamers to inquisitive kids. Or upgrade your system with a joystick or a digital camera. We have something for everyone on your holiday gift list. Even if it doesn't fit in a stocking.

Gateway Select Software

Selections from Microsoft

(Available with system purchase only.)

Extreme Gaming \$99

(Content suitable for ages 17 and older)

Quake II™
Hexen II™
Battlezone™
Heavy Gear™

Extreme Gaming II \$99

(Content suitable for ages 17 and older)

Unreal™
Forsaken™
Turok® Dinosaur Hunter
The House of The Dead™

Learning 2000™ Lifetime Library

(Learning 2000 is not affiliated with Gateway 2000, Inc.)

With system purchase \$200
Through add-ons \$499

KidBuilder Preschool-Kindergarten \$99

Reader Rabbit's® Toddler
CTW/Sesame Street® Elmo's
Preschool
Reader Rabbit's® Kindergarten
(Plus 4 more titles)

KidBuilder Grades 1-4 \$99

Schoolhouse Rock™ 1st-4th
Grade Math Essentials
ClueFinders™ 3rd Grade
Adventurers
Slam Dunk Typing™
(Plus 4 more titles)

KidBuilder Grades 5-8 \$99

The Oregon Trail® 3rd Edition
Pioneer Adventures
Success Builder™: Algebra 1
Compton's 3D World Atlas™
Deluxe
(Plus 4 more titles)

Family Reference Bundle \$79

Grolier Multimedia
Encyclopedia®
Mayo Clinic® Family Health
Mindscape's® World Atlas &
Almanac
National Geographic Really
Wild Animals™ Swinging Safari
Explore and Print
Rand McNally TripMaker™ 1998

Kid's BackPack™ \$99

Lego® Island
Animaniacs™
Sonic™ 3D Blast™
Carmen Sandiego Word Detective™
Sonic and Knuckles™ Collection

Microsoft Home Essentials™

Encarta® 98
Greetings Workshop
Money
Word
Works
Entertainment Pack: The
Puzzle Collection

Microsoft Professional Resource Suite \$99

Bookshelf® 98
Encarta Virtual Globe 98
Expedia™ Streets 98
Expedia Trip Planner 98
Publisher

Microsoft Action Titles \$99

Age of Empires™
Close Combat™
Flight Simulator 98
Monster Truck Madness™
DreamWorks Interactive™:
DILBERT'S™ Desktop Games
DreamWorks Interactive: The
Neverhood™

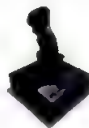
Microsoft Child Adventure Suite \$99

3-D Movie Maker
Creative Writer 2
Plus! For Kids
Scholastic's The Magic School
Bus™ Explores the Rainforest
Scholastic's The Magic School
Bus Explores in the Age of
Dinosaurs
DreamWorks Interactive:
Goosebumps-Attack of
the Mutant™
DreamWorks Interactive: Chaos
Island-The Lost World™

Peripherals



Epson® PhotoPC™ 550
Digital Camera \$199



Thrustmaster® Top Gun™
USB Joystick \$49



Sketchboard™ Drawing Tablet
for Kids \$99 (\$30 rebate available
through 12/31/98)

Epson PhotoPC 700
Digital Camera \$599

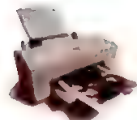
APC® Back-UPS® Office
Uninterruptible Power Supply
(UPS) \$99

Kensington® PC Starter Kit \$49

Canon® BJC®-4300 Color
Bubble Jet Printer \$159

APC Back-UPS 500 UPS \$159

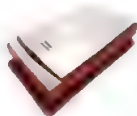
Kensington Saddlebag \$79



Epson Stylus® 640 Color
Ink Jet Printer \$199

APC Back-UPS Pro 650s UPS \$299

kidBoard® Keyboard \$49



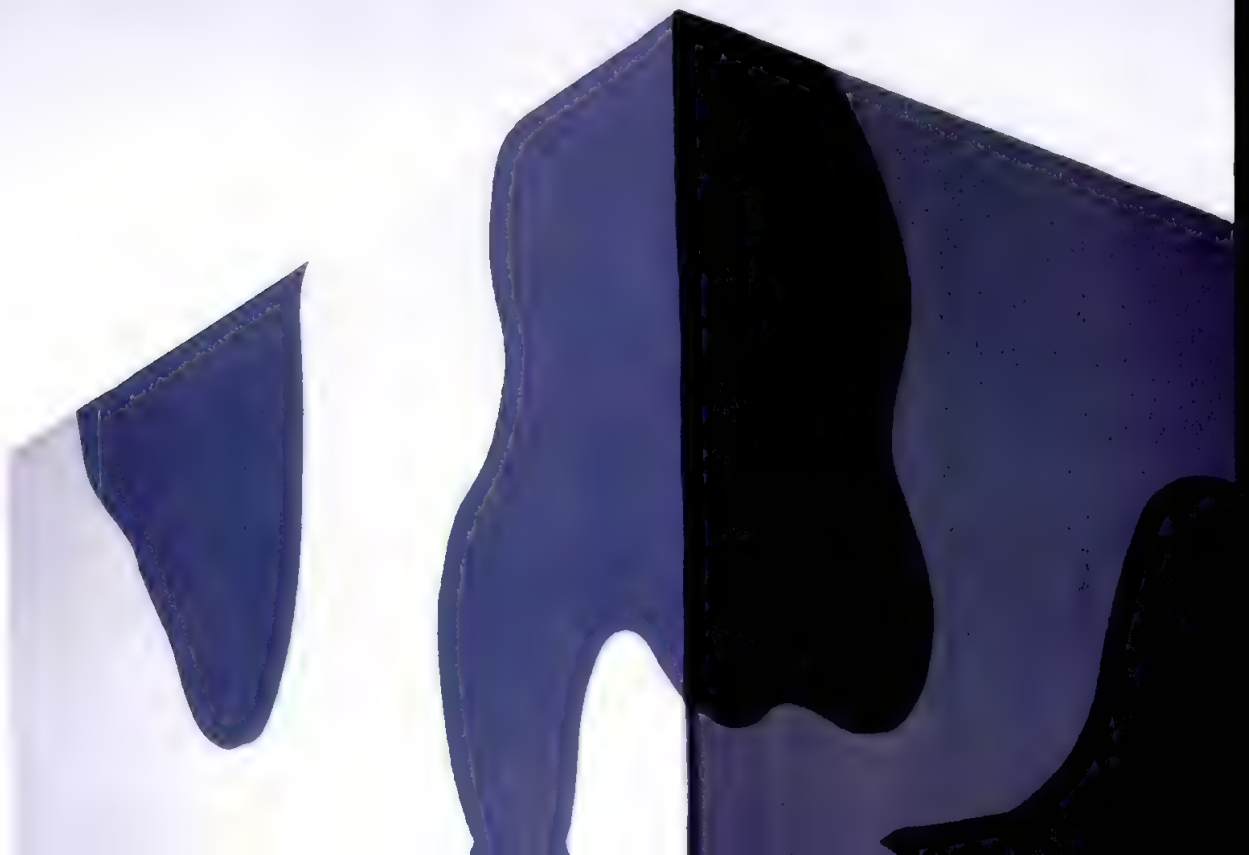
Visioneer® PaperPort™ 6100
Color Scanner \$179

call 1-800-270-5732
www.gateway.com/yourware

Let's talk about your **Gateway**

© 1998 Gateway 2000, Inc. All rights reserved. Gateway and the Gateway stylized logo are trademarks and YourWare is a service mark of Gateway 2000, Inc. The Intel Inside Logo, Intel, and Pentium are registered trademarks, and Celeron and Pentium II Xeon are trademarks of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies. Many Gateway products are engineered to Gateway specifications, which may vary from the retail versions of the software and/or hardware in functionality, performance or compatibility. All prices and configurations subject to change without notice or obligation. Prices do not include shipping and handling or any applicable taxes. 1. Gateway purchases will qualify for the YourWare program by 1) financing through a Gateway authorized lender; 2) purchasing six months of gateway.net™; and/or 3) buying an additional software bundle. Trade-in available at any time between the first day of the 24th month and the last day of the 49th month after delivery of YourWare product. Trade-in credit is only available if you purchase a new Gateway product. Gateway will give you the wholesale value on the YourWare product, in good condition as determined in Gateway's sole discretion, using the then current Onor Blue Book or another, similar commercially reasonable industry standard determined by Gateway. Other terms and conditions apply. Call our toll-free number for details. 2. Maximum data transfer rate dependent upon certain variables, including particular modems with which you are communicating, telephone lines, communications software and communications protocols. 3. \$14.95 gateway.net pricing based on 6-month commitment. \$15 fee for early cancellation. \$14.95 for unlimited access not available in all areas.

LET'S TALK ABOUT POWER TO YOUR BUSINESS.



**THIS REPRESENTS LOYALTY,
TRUSTWORTHINESS
AND DEDICATION.
AND SO DOES THE DOG.**



We build specifically for your business because we get to know your business. We've never believed that small business should take a backseat to anyone. That's why, over the years, we've built a team of professionals dedicated to small business. That's why we offer online and fax technical support, 24-hours-a-day, seven-days-a-week. It's why we have Small Business Solutions Centers in all Gateway Country® locations. And, maybe most important, it's why we continue creating the hottest, most innovative networked desktops, portables and award-winning servers, all customized for your small business. Take a good, long look. This is a package that not only gives your business more capability. It gives it something else. Power.



• **The Business Builder**

• **Solo® Multimedia Portable (2500LS)**

- Intel® Pentium® II Processor 233MHz with 512K cache
- 32MB SDRAM
- 4GB Ultra ATA Removable Hard Drive
- Microsoft® Windows® 98
- MS® Office 97, Small Business Edition



• **Network-Ready Desktop PC (GP6-333Q)**

- Intel® Celeron™ Processor 333MHz with 128K Cache
- 32MB SDRAM
- MS Windows 98
- MS Office 97, Small Business Edition



• **ALR® Series Server (730Q)**

- Intel® Pentium® II Xeon™ Processor 450MHz with 512K Cache
- 128MB of PC100 ECC SDRAM
- 4GB 7200 RPM Ultra 2 SCSI Hard Drive
- MS Windows NT® Server 4.0
- InforManager™ Server Management System
- FCC Class A Emission Standard*



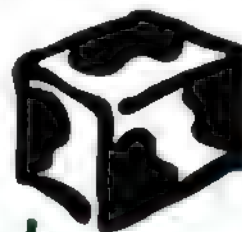
• **Also Included**

- 10/100 Hub & Network Cables
- Award-winning Service & Support
- Dedicated small business sales team

• **lease it all for as low as \$199/mo!**

1-800-270-5732

www.gateway.com/smbus



Gateway™

POWER TO YOUR BUSINESS

© 1998 Gateway 2000, Inc. All rights reserved. Gateway and the Gateway stylized logo are trademarks of Gateway 2000, Inc. The Intel Inside Logo, Intel and Pentium are registered trademarks and Celeron, MMX and Pentium II Xeon are trademarks of Intel Corporation. All other brands and product names are trademarks or registered marks of their respective companies. Gateway 2000 Country Stores, Inc. is a wholly owned subsidiary of Gateway 2000, Inc. Many Gateway products are custom-engineered to Gateway specifications, which may vary from the retail versions of the software and/or hardware in functionality, performance or compatibility. All prices and configurations subject to change without notice or obligation. Prices do not include shipping and handling or any applicable taxes. 1. Leasing provided by independent leasing companies to qualified commercial customers. Lease payments based on 48-month term. Lease terms subject to change without notice or obligation. *FCC Class A products may not be sold for home use.

**FULFILLING THE
AMERICAN DREAM TAKES
HARD WORK, SMARTS
AND COURAGE.
DIRECTIONS COULDN'T HURT.**



Building technology specifically for your business is just the start of what we provide. You also benefit from the years of experience that our dedicated small business team provides. Gain insights from our Small Business Solutions Centers, located at every Gateway Country® location. Take advantage of our 24-hours-a-day, seven-days-a-week tech support online and by fax. But most important, your business can grow from our ongoing innovations with networked desktops, portables and award-winning servers, all custom-built just for your small business. Together, our package gives your business the competitive edge: power.



Solo® Portable PC (5150LS)

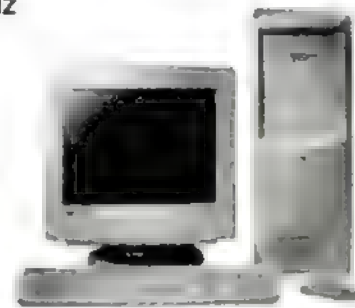
- Intel® Pentium® II Processor 233MHz
- 64MB SDRAM
- 4GB Ultra ATA Removable Hard Drive
- Microsoft® Windows® 98
- MS® Office 97, Small Business Edition



**Lease for '89/mo.
or '2899**

Network-Ready Desktop PC (GP6-350)

- Intel Pentium II Processor 350MHz
- 64MB SDRAM DIMM
- 6.4GB ATA Hard Drive
- Microsoft Windows 98
- MS Windows 97, Small Business Edition



**Lease for '52/mo.
or '1699**

Network-Ready Desktop PC (GP6-400)

- Intel Pentium II Processor 400MHz
- 64MB SDRAM DIMM
- 10GB ATA Hard Drive
- Microsoft Windows 98
- MS Windows 97, Small Business Edition

**Lease for '61/mo.
or '1999**

Business Graphics Bundle '149

Visio® Standard 5.0, Adobe® Photo Deluxe® Business Edition, LiveArt™ 98, Simply 3D™ 3

Web Page Creator '129

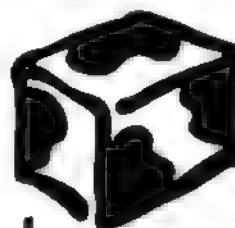
Adobe® PageMill® 3.0, Micrografx® Webtricity™ 2

Quickbooks® '119

Quickbooks Pro® Software '219

1-800-270-5732

www.gateway.com/smbus



Gateway™

POWER TO YOUR BUSINESS

© 1998 Gateway 2000, Inc. All rights reserved. Gateway, Gateway Country, Solo and the stylized Gateway logo are trademarks or registered trademarks of Gateway 2000, Inc. The Intel Inside Logo, Intel and Pentium are registered trademarks of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies. Gateway 2000 Country Stores, Inc. is a wholly owned subsidiary of Gateway 2000, Inc. Many Gateway products are engineered to Gateway specifications, which may vary from the retail versions of the software and/or hardware in functionality, performance or compatibility. All prices and configurations subject to change without notice or obligation. Prices do not include shipping and handling or any applicable taxes. 1. Leasing provided by independent leasing companies to qualified commercial customers. Lease payments based on 48-month term. Lease terms subject to change without notice or obligation.

Choose 099 at www.pcmag.com/infolink

YOU'VE GOT TO SEE IT IN

EPSON

COLOR.

HERE YOU
SEE HER
EVERY
GOLDEN
STRAND
OF HAIR.

HERE YOU
SEE THE
PROJECTOR
THAT WEIGHS
LESS THAN
SHE DOES.

Just like her, this incredible projector can easily hold an audience. Because instead of having only one imaging processor like other ultraportables, the PowerLite™ 5500C was born with three – for the brilliance of a large projector, without the bulk. In fact, at 650 ANSI lumens and only 9 1/2 pounds, this little baby will have everyone going ga-ga.



Epson PowerLite 5500C

THE NEW POWERLITE 5500C ULTRAPORTABLE PROJECTOR. 3 LCDs BRIGHT - 9 1/2 LBS LIGHT.

Epson®, the world leader in high-performance portable projectors, brings you a full-featured ultraportable with: Exclusive SizeWise™ technology that allows compatibility with computer resolutions up to 1024 x 768 • Zoom lens, remote control and amazing SRS 3D sound • Dedicated phone support and RoadService exchanges, usually within 24 hours.

For more information or a free video on Epson's award-winning line of projectors,
call 1-800-442-1977 (ask for Oper. 3101) or visit www.epson.com.

Epson is a registered trademark of Seiko Epson Corp. PowerLite and SizeWise are trademarks of Epson America, Inc. ©1998 Epson America, Inc. Projected image simulated for publication.

Choose 004 at www.pcmag.com/infolink

PC-Free Printing

Lexmark's Photo Jetprinter 5770 prints digital photos from CompactFlash and SmartMedia.

By Bruce Brown

Those of you who own a digital camera should consider the new Lexmark Photo Jetprinter 5770 (\$350 street)—even if you don't have a computer. With internal CompactFlash and SmartMedia card readers (the two most common methods of storing digital camera images), you just insert the card in the printer, zoom, crop, and frame images, and then print them with up to 1,200-by-1,200 resolution, 1.4-megapixel, 6-color ink jet printing.

The 5770 also can access and print digital images stored on disks in an attached Iomega Zip Drive. A Zip Drive isn't included, but Lexmark has announced its intention to release a future model with one built in. If you

hook up the printer to a PC, you'll find the features of the familiar and appealing Lexmark Color Jetprinter 5700, which provides the core printing technology for the 5770.

The 5770's print engine inherits the 5700's laser-cut printhead with 1,200-by-1,200 maximum resolution and maximum-rated print speeds of 8 ppm in black draft mode and 4 ppm in color draft mode. A 100-sheet paper input tray with Lexmark's Accu-Feed variable pressure system (adopted from the company's laser printers) has proved reliable in testing and allows you to load different types and weights of print media simultaneously.

Like the 5700, the 5770 uses the PC's CPU and memory to



RELOAD: CompactFlash and SmartMedia cards fit into slots on the Lexmark Photo Jetprinter.



process images. For direct photo printing via card slot or Zip Drive, however, Lexmark added a Hitachi SH-1 processor, 8MB of RAM, and flash ROM.

When you print from a PC,

the printer still runs in host-based mode, passing the signals through the new electronics. Lexmark hasn't announced flash ROM upgradability, but it appears to be possible if new file formats emerge.

In direct print mode, the 5770 works with JPEG compressed image files from most digital cameras. The printer's CompactFlash and SmartMedia slots and the Zip Drive connection are all "hot," automatically detecting inserted media.

In testing, a near-production printer worked successfully with SmartMedia samples and most CompactFlash media.

There was an intermittent problem reading a Kingston Technology CompactFlash card, which may have been a sample error.

Printed output from the 5770 is excellent. If you use a megapixel camera in high-quality mode, even full-page 8- by 10-inch prints look near-film-print quality. The printer's control panel has a hierarchical feature menu that lets you choose single, all, or selected images from storage media or from preprogrammed zoom, crop, panoramic, or frame effects.

The 5770 comes standard with Lexmark color ink and photo ink cartridges. Replacements cost \$36 and \$40 (direct), respectively. For PC printing, you'll want to buy a black ink cartridge as well (\$29.50).

The Lexmark Photo Jetprinter 5770's versatility and print quality vaults the unit to the top of its class as the first fully convergent digital photography and PC color ink jet printer.

Lexmark Photo Jetprinter 5770. Street price: \$350. Requires: 8MB RAM, 20MB hard disk space, Microsoft Windows 95 or 98. Lexmark International Inc., Lexington, KY; 800-539-6275, 606-232-2000; www.lexmark.com; 430 at www.pcmag.com/infolink.

Greetings From HP

Hewlett-Packard's Printable Expressions Greeting Card Collections include graphics, greetings text, and paper stock that can be used with any color ink jet

designed to take advantage of the small ink dots in HP's DeskJets, but the software can be used with other printers as well. Indeed, cards printed on Epson and Lexmark ink jet printers looked as good as any you'll find on the shelf at the drugstore.

A card maker wizard walks you through card design and printing. The

collections include wildlife, floral, Christmas, all-occasion, humor, and seasonal cards, as well as collections from specific artists.

The per-card price of \$1.20 (assuming you don't make mistakes) may seem high—but not if you've purchased commercial cards lately. It helps to pick a collection that has several images you like a lot. But even if you find a single favorite card—for the holidays, for example—you can print 20 copies and come out ahead. Replenishment packs of 20 cards with envelopes (\$15 street) are also available.—BB

Printable Expressions Greeting Card Collections. Street price: \$24 per collection. Requires: 16MB RAM, Microsoft Windows 95, 98, or NT 4.0 or later. Hewlett-Packard Co., Palo Alto, CA; 800-752-0900; www.hp.com; 429 at www.pcmag.com/infolink.

printer to create gorgeous cards. There are 12 collections (\$24 street for each collection), and each set comes with 24 different images (licensed from professional artists and photographers) on a CD-ROM, 100 editable greetings, and 20 blank cards with envelopes in a variety of paper styles and textures.

The Printable Expressions sets were

IN THE CARDS: Create personalized cards with HP's Printable Expressions.



No-Fear Illustrator

Adobe breathes new life into Illustrator by delivering more powerful tools that are also easier to use.

By Luisa Simone

The new drawing tools in Adobe Illustrator 8.0 (\$380 street) make it unnecessary to understand the dynamics of Bezier curve editing. For the first time, Illustrator has also adopted a standard selection mode that lets first-time users move and resize objects easily—leaving the sometimes confusing direct and group selection tools to more experienced users. The new Pencil lets you reshape curves by drawing over an existing outline, and the Smooth tool can remove extra nodes and

round out jagged curves with a simple dragging motion.

Illustrator meets the needs of its core constituency—professional artists—with several new powerhouse features. Gradient meshes, for example, are nothing less than a new paradigm for blended fills. A gradient mesh fills an outline with an editable 2-D lattice. Each vertex in the lattice can be moved and recolored to produce a multicolor, multidirectional gradient.

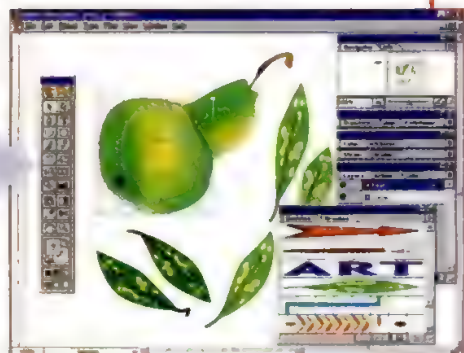
The new class of brushes in Il-

lustrator uses vector artwork as the basis for a brushstroke. Art brushes resize and twist a single instance of the image to match the shape of the stroke. Scatter brushes vary the position and angle of multiple copies of the artwork in relation to the

modify the seed shapes that form the blend or the path the blend follows.

We noted in our preview of Illustrator 8.0 ("Professional

FILLING: Illustrator's new gradient mesh tool allows you to sculpt with color.



line. Pattern brushes repeat a series of images to form a seamless border along lines and around corners.

Finally, live blends now let you create morphs between more than two shapes. And you can use standard editing tools to

Graphics," September 22, 1998), that many of the program's new functions, specifically gradient meshes and art brushes, are closely tied to the capabilities of PostScript Level 3. The release version of the software, however, also proved to be backward-compatible with PostScript Level 2 and output our test files without error.

Adobe has tweaked Illustrator in a dozen different ways. We liked the new Smart Guides, which help you align objects as you draw, the 6,400-percent zoom, and the ability to choose between Illustrator's established color-matching system and the Kodak Digital Science CMS. Illustrator also borrows several features from other Adobe products, including tabbed palettes, a Navigator, and recordable Actions.

In the computer graphics world, Illustrator has always been identified with an aesthetic that featured hard-edged shapes and simple object blends. Illustrator 8.0 lets artists break out of that mold and work with more realistic images and diverse styles.

Adobe Illustrator 8.0. Street price: \$380 (upgrade, \$129). Requires: 32MB RAM, 50MB hard disk space, Microsoft Windows 95, 98, or NT 4 or later. Adobe Systems Inc., San Jose, CA; 800-649-3875; www.adobe.com; 419 at pcmag.com/infolink.

WinZip Retools

The latest version of Nico Mak's WinZip adds CAB support and a customizable interface.

By Barry Simon

Considering WinZip's combination of elegance, simplicity, and functionality, its popularity is well deserved. WinZip 7.0 (\$29 direct) now supports CAB (a compressed format used to deliver software) and the ability to create self-extracting archives that span multiple disks. The new interface is more customizable, with the ability to change toolbars and directory columns. Configuration is also easier with a single multitab dialog.

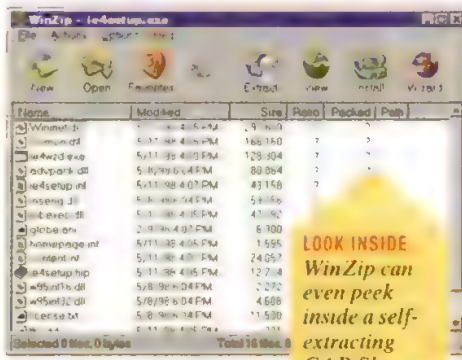
A CAB viewer for Windows 95 and NT 4.0 is included with Microsoft's free PowerToys, and a similar viewer is built into Windows 98. But the CAB support in WinZip 7.0 goes beyond what Microsoft's viewer supplies in a number of important ways.

The Microsoft CAB viewer displays a directory and lets you extract files—but nothing more. WinZip provides the same capa-

bilities for files inside a CAB that it has long provided for files within a ZIP. You can launch an EXE file or a document from the CAB and have WinZip extract it to a temporary directory and clean up the extracted file afterwards. You

can view files inside a CAB that it has long provided for files within a ZIP. You can launch an EXE file or a document from the CAB and have WinZip extract it to a temporary directory and clean up the extracted file afterwards. You

can view files inside a CAB that it has long provided for files within a ZIP. You can launch an EXE file or a document from the CAB and have WinZip extract it to a temporary directory and clean up the extracted file afterwards. You



can view files inside a CAB that it has long provided for files within a ZIP. You can launch an EXE file or a document from the CAB and have WinZip extract it to a temporary directory and clean up the extracted file afterwards. You

The most extensive changes in the new version let you change many features of the main Win-

Zip remains the most attractive ZIP file manager for both novice and serious users. Long-time users will want this upgrade, which is free for registered users.

WinZip 7.0. Price: \$29 or free upgrade. Requires: Windows 95, 98, or NT 4.0. Nico Mak Computing, Mansfield, CT; www.winzip.com; 420 at www.pcmag.com/infolink.

Rodéo 1000 SERIES



Strikingly Powerful - Amazingly Slim!!

Introducing the Rodéo 1000 series. A technological tour de force of unsurpassed power and innovation. Housed in a slim 1.5" thin 6.5 pound package is a heavyweight workhorse driven by the latest mobile Intel® Pentium® II processor running at up to 300MHz. This sleek profile allows you to carry tomorrow's technology anywhere you go today. And all of this at an amazingly affordable price.



Mobile Intel® Pentium® II
Processor Up To 300MHz

512KB L2 Cache

1.5 Inches THIN
6.5 Lbs. LIGHT

34K Text/Windows

37 MB Cache and
Zoomed Video Support

100,000+ A/C-Hrs.
Back Environmentally

USB & Fast Ethernet Port

16 Bit 3D Sound
With Synthesizer

Fast Ethernet Capable

Built-In 2X DVD
or 24X CD-ROM

Rodéo 1000GT

Pentium® II Processor 266MHz
12.1" SVGA TFT • 24xCD
32MB/128MB RAM
4.0GB HDD • 56K Modem

\$1,995*

Rodéo 1000CX

Pentium® II Processor 266MHz
13.3" XGA TFT • 24xCD
32MB/128MB RAM
4.0GB HDD • 56K Modem

\$2,195*

Rodéo 1010GT

Pentium® II Processor 300MHz
12.1" SVGA TFT • 2xDVD
64MB/128MB RAM
4.0GB HDD • 56K Modem

\$2,495*

Rodéo 1010CX

Pentium® II Processor 300MHz
13.3" XGA TFT • 2xDVD
64MB/128MB RAM
4.0GB HDD • 56K Modem

\$2,695*

Call For A Dealer
Nearest You Or Visit Our Website



Putting the Future in Your Hands

800-868-8108
www.amstech.com
12881 Ramona Blvd. • Irwindale, CA 91706
626-814-8851 Fax 626-814-0282



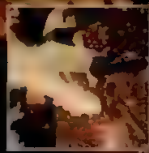
Choose 235 at www.pcmag.com/infolink

**"THEIR ADVENTURE WAS NO PICNIC,
BUT WATCHING IT CERTAINLY WAS!"**

- YOUR SISTER



**AN OVERLY
GLING-HO FATHER**



**A GOURMET
MOM**

**"A REAL FAMILY PICTURE. I LAUGHED.
I CRIED. I EVEN CRIED LAUGHING."**

- YOUR UNCLE



**AN OUTDOORSMAN
OF A DAUGHTER**



**A PRANKSTER
OF A SON**



SONY VAIO DIGITAL STUDIO™ PC
PRESENTS

YOUR MOVIE

THE STORY OF YOUR FAMILY'S
UNFORGETTABLE CAMPING TRIP.

SELECTED BY YOU
WRITTEN BY YOU

EDITED BY YOU
AND STARRING YOU

YOU AND YOUR FAMILY

EASIER THAN YOU THINK

YOU CAN TAKE YOUR OWN MOVIES
TO GO WITH YOUR FAMILY

The biggest movie studio these days isn't in Hollywood. It's in your home. Introducing the Sony VAIO Digital Studio, a PC with all kinds of cinematic possibilities. Editing is easy with our DVgate™ Motion digital video editing software (included with your PC). Sony AV/IT convergence and i.LINK™ (IEEE 1394) interface give you a fast, high-quality connection

VAIO



between the Sony Digital Handycam® camcorder and your PC. And, with S-Link™ technology and Optical Digital Audio Out, you can connect to a Sony MiniDisc deck to make custom recordings.* All you need to hit the big screen, is a big idea. For locations, call Sony VAIO Direct toll-free at 1-877-456-SONY. For a sneak preview, visit www.sony.com/digitalstudio

SONY

Sony VAIO Digital Studio PC: 450 MHz Intel® Pentium® II Processor • 128 MB SDRAM • 13.6 GB Hard Drive • 5X DVD-ROM (max) • i.LINK™ (IEEE 1394) • Optical Digital Audio Out and S-Link™ Technology • 2X AGP 3D Graphics • V.90 Modem

©1998 Sony Electronics Inc. All rights reserved. Reproduction in whole or in part without written permission is prohibited. Sony, the Sony logo, VAIO and i.LINK are registered trademarks of Sony. i.LINK, i.LINK logo, VAIO, D, and Studio are trademarks of Sony. Intel and Pentium are registered trademarks of Intel Corporation. Features and specifications are subject to change without notice. *Always observe appropriate copyright laws. SONY 0811

Choose 388 at www.pcmag.com/info/ink

Not So HoTMetaL

SoftQuad's HoTMetaL PRO 5.0 offers powerful but complicated Web site editing.

By Edward Mendelson

SoftQuad's \$100 (street) HoTMetaL PRO 5.0 is a Web site editor that can't decide whether it's targeted at new users or expert Web masters and may leave both groups dissatisfied. New users can build individual pages or entire Web sites using wizards and templates, but these automated tools lack the flexibility of Microsoft FrontPage 98 or NetObjects Fusion.

Expert users get the first editing program with full support for the HTML 4.0 specification, a

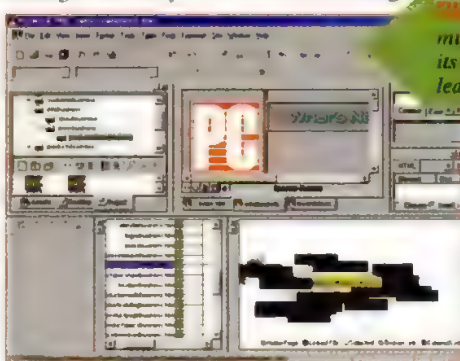
unique semi-WYSIWYG editing

mode that displays tiny icons showing HTML tags normally visible only when editing raw code, tools for inserting Dynamic HTML (DHTML) behaviors and JavaScript codelets, but without the automatically completed tags in Allaire's HomeSite or the elaborate DHTML interface of

Macromedia's DreamWeaver.

The basic interface has a multipane file manager on the

left and a tabbed editing window on the right. The editing window switches easily among code-based, WYSIWYG, and preview modes, in addition to an easy-to-use frame-editing



the current tag can be added or changed; the inspector works only in WYSIWYG mode and won't hide inappropriate attributes like "shape" in tags that

HoTMetaL sprouts multiple windows when using its site and asset managers, leaving little room for editing.

consist only of text.

A mouse click converts the file-management pane into a powerful but dizzyingly confusing asset manager for storing graphics, code snippets, DHTML behaviors, and other resources. You can drag images and JavaScripts into the editing window, but only in WYSIWYG mode.

You can add resources to the manager's tree-structured organization but only by burying them in a subtree, and you have to edit an INI file to change the name of the manager's top-level folder. Other tools include testing HTML compliance and handicapped accessibility; pages created by the program's wizards failed some of these tests.

The site manager displays charts of files linked to individual pages and tends to be too densely packed to be usable. The stylesheet editor misunderstands font names without quotation marks and changes a style that calls for Arial Black into a style that calls for two fonts, Arial and Black.

Despite its faults, HoTMetaL PRO 5.0 has plenty of power and a cornucopia of third-party graphics-editing and other tools. Those already using the program will want to upgrade, but anyone in the market for a new HTML editor should probably look elsewhere.

HoTMetaL PRO 5.0. Street price: \$100 (upgrade \$50). Requires 16MB RAM, 40MB hard disk space, Microsoft Windows 95, 98, or NT 4.0 or later. SoftQuad Inc., Toronto; 800-387-2777, 416-544-9000; www.softquad.com; 412 at www.pcmag.com/infolink.

Interface and Internet

The latest version of VirusScan features a new UI and improved e-mail and download protection.

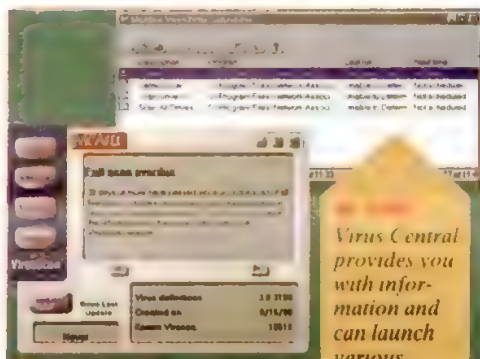
By Barry Simon

Network Associates has released Version 4.0 of McAfee VirusScan, its popular antivirus program. You can purchase this product either as a standalone application for \$50 (street) or as part of McAfee Office—a \$100 bundle of ten utilities.

The most important new elements of VirusScan 4.0 involve the Internet. The program can now scan incoming e-mail that uses MAPI (Microsoft Exchange and Outlook) or that downloads using POP3-to-text-based formats, such as America Online, Eudora Light, or Netscape. The program can also scan potentially harmful ActiveX controls or Java classes before they run.

You can still update virus definition files over the Internet, and an included program lets you schedule such downloads, as well as regular virus scans. The program includes SecureCast, a licensed version of BackWeb that

lets you update virus definitions files in the background using push technology. You can also use VirusScan to generate automated e-mail to the company's virus center with infected files attached, for situations when the



Virus Central provides you with information and can launch various components, including the scheduler.

program can't automatically clean them.

All background-scanning processes—real-time virus checking, e-mail or download scanning, and ActiveX and Java class filtering—are now controlled through VShield, which sits in the taskbar. VirusScan Central provides quick access to the Scanner, VShield, Scheduler, on-demand Update, and Tools.

We compared McAfee VirusScan with Norton AntiVirus, and AntiVirus proved speedier. A scan of the Windows 98 directory on one test system took VirusScan 362 seconds (to scan 1,278 files) with its default settings. With AntiVirus set not to scan compressed files (agreeing with VirusScan's default), it took 223 seconds to scan 1,319 files.

Because you can schedule scans to run at night or use VirusScan's ability to scan while your screen saver is running, speed may not matter much, but if you have to scan a large hard disk, expect the process to take a considerable amount of time.

This new version keeps VirusScan in the running as a serious competitor to the new

Norton AntiVirus.

VirusScan 4.0. Street price: \$50. Requires: 10MB hard disk space, Microsoft Windows 95, or 98. Network Associates Inc., Santa Clara, CA; 800-338-8754, 408-988-3832; www.mcafee.com; 413 at www.pcmag.com/infolink.

"When will I
finally get the
affordable, high-speed internet access
I was promised?



"Right



How long have YOU been waiting?

If you've been holding out for the cable or telephone company to bring high-speed Internet access to your neighborhood, chances are it's been a while. Which is a shame, because if you'd chosen DirecPC, you could be surfing at up to 400 Kbps **right now**. That's up to 14 times faster than a standard 28.8 modem and almost three times faster than an ISDN line.

It's easy.

How do you get started? Just visit us at www.direcpc.com to find a retailer near you. If you can't find a store in the neighborhood, call us at 1-800-DIRECPC. We'll send you your dish, satellite modem, software and everything else you need. We

HARDWARE
AS LOW AS

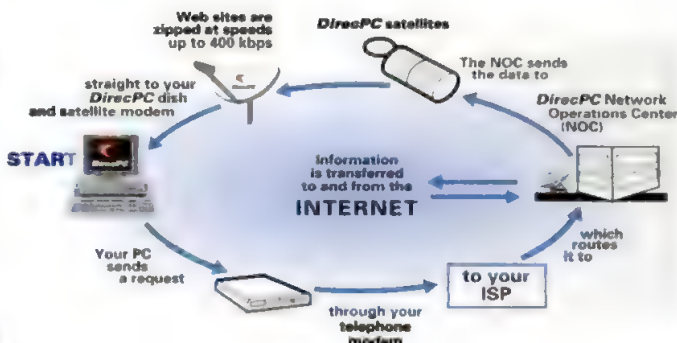
\$199



can arrange professional installation for you, too. Either way, getting started is just a phone call or a mouse click away.

How does it work?

The engineers at Hughes figured out that the real bottleneck in the speed of the Internet wasn't the request **out** to the Web — telephone modems handle that just fine. Everything slows down when the Web tries to use the telephone system to send you **back** the media-rich information you requested. So, we use a much faster satellite connection for sending you the Web content you want. Check out the diagram — this is the system that makes DirecPC the fastest Internet access available nationwide.



[illegible]

Hot New Notebooks from IBM and Toshiba

The top vendors show off their best, with the ThinkPad 560Z, ThinkPad 770X, and the Portégé 3010CT.

By Asa Somers

You don't have to be a misunderstood 300-foot lizard to know that size does matter. Take notebooks, for example: The smaller they are, the less you have to carry. But with their smaller size comes less room for conveniences, and today's microthin and ultraportable laptops still force you to make sacrifices in terms of features that simply won't fit inside the box.

The three hot-off-the-conveyor-belt machines we tested in this miniroundup run the gamut from the big-and-square (the honkin'-big ThinkPad 770X) to the barely there (a wisp of a laptop called the Portégé 3010CT). Each hits a different weight, feature set, and target price—thus appealing to a specific type of mobile user.

IBM THINKPAD 770X MODEL 7AU

Starting from the top down, there's very little not to like about the ThinkPad 770X Model 7AU, the latest in IBM's tip-top-of-the-line portable powerhouses—except its size and price. Only CAD/CAM professionals, software developers, traveling executives, presentation jockeys, and technology hounds will bear the \$6,000 (street), 7.8-pound burden that comes with this puppy, but they'll get everything they could possibly want.

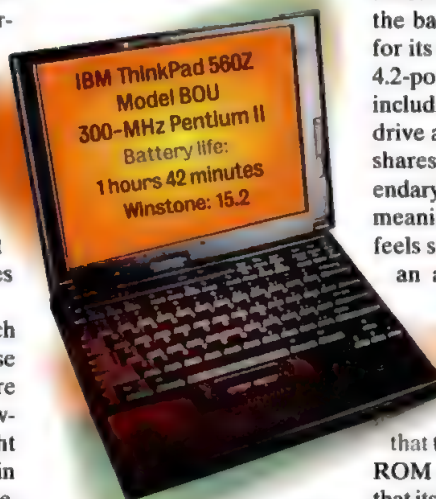
Like earlier models in the 770 line, the 770X has the best of all worlds: The latest 300-MHz Pentium II processor, 128MB of RAM, a massive hard disk, DVD, a huge screen, and every bell and whistle known to the computing public

(and a few we've yet to discover actually exist). The 770X is just a more high-powered version of earlier models and really adds only one new thing: native support for 1,280-by-1,024 (SXGA) resolution. This means that its gorgeous 13.7-inch LCD shows even more spreadsheet cells and bigger Web pages than before.

The only drawback to such high resolution is that just those with excellent eyesight are going to be able to see the now-tiny icons and downright minute 12-point default fonts in a Word document, for example. Setting the desktop to Display Large Fonts in the display control panel helps somewhat, but the results aren't always pretty. If you reset the notebook to display a lower resolution, text

high resolutions. There's also a slightly lower-priced 770X that natively supports XGA (1,024-by-768) resolution.

Still, in testing, the 770X's DVD drive, Trident Cyber 939 graphics chip set, and 8MB of SGRAM produced video that



IBM THINKPAD 560Z MODEL BOU

We've heaped enough praise on the ThinkPad 560 series in the past two years to satisfy even IBM's most driven PR reps, and still there's more to be said—this time, on behalf of the 560Z Model BOU. Right off the bat, the system is notable for its svelte profile and mere 4.2-pound weight (5.8 pounds including external floppy disk drive and AC adapter). It also shares with the 770X the legendary ThinkPad fit and finish, meaning that this notebook feels sturdy, looks slick, and is an absolute dream to use.

Though its LCD is crystal clear and as bright as any we've seen, it measures a mere 12.1 inches diagonally. Given that the 560Z also lacks a CD-ROM drive, we'd have to say that its \$3,800 street price places it in a specialized marketing bracket targeting mobile executives. Memo to ThinkPad design team: There appears to be room in the bezel for a larger screen. Moreover, 12.1-mm CD-ROM devices easily fit in other machines of comparable thickness, so there's no reason we see why the 560Z couldn't have both of these things. Then, it would truly be the perfect notebook.

Beyond its high-end features which include a 300-MHz Pentium II CPU, 64MB of RAM, a 56-Kbps PC Card modem, and a 6.4GB hard disk—the 560Z has perhaps the most comfortable notebook keyboard we've ever used. With its sculpted wrist rest, full-size Backspace key, "press-to-select" TrackPoint device, and optimal key layout, it truly is a joy to use. Its full array of standard ports, including USB and 4-Mbps IR, worked well in testing.

In terms of processing performance, the 560Z handled our Winstone tests with aplomb, turning in an admirable score of 15.2 when set for SVGA mode at 16-bit color. When we increased its color depth to 24-bit,

looked simply brilliant on the screen. And being able to see more of a long Web page without scrolling is a delight. Compatibility isn't an issue with this machine: Our PC Card and USB devices worked without incident, and we were able to hot-dock the swappable floppy disk drive externally via its additional port and the included cable.

In terms of performance, the 770X didn't quite live up to our hopes. We ran our Business Winstone 99 test at the unit's native SXGA resolution and 16-bit color, and it turned in a score of 13.9. As expected, its battery life was below average for this processor class, and yet its score of 2 hours 28 minutes on our BatteryMark test is fairly understandable for a machine with such power-hungry components.

IBM ThinkPad 770X Model 7AU. Street price: \$6,000. IBM Corp., Somers, NY; 800-426-7255; www.ibm.com/pc/us/thinkpad; 414 at www.pcmag.com/infolink.



and graphics (as expected) look blocky and distorted. But this shouldn't be an issue for IBM's main target audience for the 770X: CAD designers and software developers who demand

Creating

the **Live! experience.**

Live the experience!

awesome
AUDIO



explosive
GRAPHICS



thrilling
PC-DVD



sensational
SPEAKERS



CREATIVE

We're unleashing a revolution



You'll be captivated!

on in audio.

Sound BLASTER

Live!

Sound Blaster® Live!™ changes everything you know about audio. We will surround you with an Environmental Audio™ sound experience so amazingly real, it has to be Live! Create new experiences with a wealth of breakthrough



**Environmental
Audio™**
by CREATIVE™

So Real It Has To Be Live!

technology that surpasses most Hollywood-quality audio equipment. Modify any sound source in real-time using amazing audio special effects like flanger, pitch shifter, echo, and distortion. Record and playback crystal-clear audio using the included digital inputs and outputs. Hear audio with more clarity and vibrance than you've ever heard before with hardware accelerated audio streams and multiple speaker support. Experience the ultimate in gaming with Environmental Audio™ support in the coolest new games. Not only will Sound Blaster® Live!™ make your existing games and legacy audio sound so clear, it will be like hearing them for the first time. It's the audio thrill of a lifetime.

To maximize your true surround-sound experience, add the Cambridge SoundWorks® PCWorks™ FourPointSurround™ speaker system. It uses four discrete amplified speakers and a separate powered subwoofer to produce effective surround audio — regardless of room acoustics, player head position, or speaker placement. Now you can experience truly immersive 3D audio.

SOUNDWORKS



PCWorks™ FourPointSurround™

Sound Blaster® Live!™ features:

- > Hollywood-quality re-creation with an astounding -120dB noise floor
- > E-mu's most powerful audio processor with 1000+MIPS and 8-point interpolation
- > Digital I/O card for easy connection to music keyboards and digital audio recorders
- > Environmental Audio™ — enhances all audio content from the past, present, and future
- > Live!ware program provides updates over life of product
- > Hundreds of cool new and upcoming titles with EAX™ support

Cambridge SoundWorks® PCWorks™ FourPointSurround™ features:

- > Four compact satellite speakers and a powered subwoofer
- > Rear surround speakers can be placed anywhere with the included tripod stands and wall mounting accessories
- > In-line master volume control for all four satellite speakers and subwoofer
- > Delivers discrete 4-channel surround audio with Microsoft® DirectSound®3D and Creative's Environmental Audio eXtensions™ games

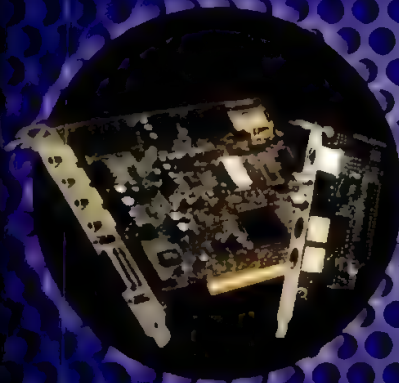
"With the ability to do real-time effects, a bevy of digital connectors, and budding support for EAX™, the Live! is a winner..."

— Maximum PC, October 1998
Maximum PC Verdict 10

"Sound quality that's nearly impossible to match at this price..."

Possibly the best buy in PC audio."

— PC Gamer, October 1998
PCWorks™ FourPointSurround™



Sound Blaster® Live!™ — the most powerful sound-card ever!

www.soundblaster.com/experience/

the Live! experience.

Live the experience!

We're taking you to the edge



You'll be glued to your seat!

ge of the universe.

3D BLASTER®

Banshee

Buckle up and brace yourself for the visual ride of your life! 3D Blaster® Banshee explodes with rocket-fast 2D performance, startling 3D frame rates, and break-neck video acceleration with an absolutely out-of-this-world price.



Its screaming speed comes from the 128-bit 3Dfx Voodoo Banshee™ processor, which offers Voodoo2™-like performance. A full 16MB of 100MHz synchronous memory and a 250MHz RAMDAC gives you ultra-high resolution and millions of colors. With DirectX®, Glide® and

3Dfx OpenGL® drivers, tuned for compatibility with the widest range of applications and games, this affordable, easy-to-install graphics accelerator is a must for every PC. It's a gamer's dream come true, that doesn't break the bank!

Graphics Blaster® RIVA TNT delivers blood-curdling performance. It's packed with workstation power whether you're a hard-core gamer or a hot-shot 3D designer. An ultra-wide, 128-bit memory architecture and 16MB of high-performance 125MHz synchronous memory supported by a Twin-Texel, 32-bit color 2D/3D engine that has all the toys: bump mapping, multiple texturing, and even full-screen anti-aliasing.



When you need to work with incredible precision and play games with liquid-smooth speed, Graphics Blaster® RIVA TNT is what you've been waiting for.

3D Blaster® Banshee features:

- > Complete 2D/3D graphics solution based on the new Voodoo Banshee™ chipset from 3Dfx Interactive
- > Features a full 128-bit graphics engine and Voodoo2™ 3D rendering technology
- > 16MB of SDRAM and 250MHz DAC deliver awe-inspiring resolutions, rock-solid refresh rates, and stunning visual quality
- > Boosts your PC's performance and provides compatibility with the widest range of applications and games in a single, cost effective upgrade

Graphics Blaster® RIVA TNT features:

- > World-class 2D/3D, and video acceleration using the RIVA TNT processor from nVIDIA®
- > Ultra-wide, high speed 128-bit memory architecture and Twin-Texel 3D pipeline deliver mind-numbing speed in virtually any application
- > 16MB 125MHz synchronous memory and a powerful 250MHz DAC provide incredibly high resolutions and refresh rates for brilliant, vivid images
- > Perfect platform for the power-user, gamer or graphic designer

www.soundblaster.com/experience/

"After mercilessly putting our 3D Blaster through its paces, we can happily and heartily recommend it."



— PC Gamer, May 1998
3D Blaster Voodoo2



Our graphics line-up utilizes the hottest chipsets available!

the Live! experience.

Live the experience!

We're putting you in the ac



You'll be blown away!

tion.

PC-DVD™

ENCORE 5X

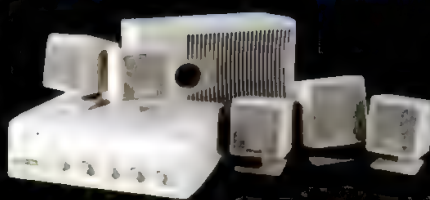
With
Dxr™ 2

A heart-pounding cinematic experience is no longer restricted to the big screen! Building on the award-winning success of Creative's PC-DVD™ products, PC-DVD™ Encore 5X brings the digital difference right to your home — complete with Dxr™ 2 enhanced resolution capabilities and Dolby® Digital audio for stunning picture and sound that will absolutely knock you off your feet! Then again, movie playback is just the beginning. PC-DVD™ also runs all your cool CD's. And it can access up to 17 gigabytes of information on a DVD-ROM. That's 25 times more than a CD-ROM!



To ensure the ultimate live experience, simply add Cambridge SoundWorks® DeskTop Theater™ 5.1 speaker system. Now you can experience truly explosive movie theater Dolby® Digital surround sound with five independent speakers and a subwoofer without the high cost of a Dolby® Digital receiver. And like any great film, words hardly do justice to the PC-DVD™ Encore 5X and the DeskTop Theater™ 5.1 speaker system.

CAMBRIDGE
SOUNDWORKS



DeskTop Theater™ 5.1

PC-DVD™ Encore 5x features:

- DVD player for your TV - The Dxr™ 2 board comes with high-quality S-video and composite outputs to connect to your TV
- DVD player for your PC - a high-definition, resolution-enhanced DVD player on your PC monitor in a fully resizable window
- 3rd Generation DVD-ROM drive screaming at 5x DVD speed
- Dxr™ 2, DynamicXtended Resolution™ Technology, movie picture enhancer is comparable or better than some expensive line-doublers

Cambridge SoundWorks® DeskTop Theater™ 5.1 features:

- Delivers movie theater sound with Dolby® Digital 5.1 and Dolby Surround® audio with PC-DVD™ or consumer DVD players
- Dolby® Digital decoder amplifier with five discrete compact satellite speakers and subwoofer. No separate receiver required
- Creative Multi Speaker Surround™ upmixes stereo to 5.1-channel surround audio
- With Sound Blaster® Live!®, it delivers discrete 4-channel surround audio with Microsoft® DirectSound™ 3D and supported Environmental Audio eXtensions™ games

"Exceptional quality... picture quality is fab, on both the PC and television monitors."



— C/NET, February 1998

5-Star Gameworthy Review,
PC-DVD Encore Dxr™ 2



PC-DVD Encore 5x is the best way to watch movies at home.

www.soundblaster.com/experience/

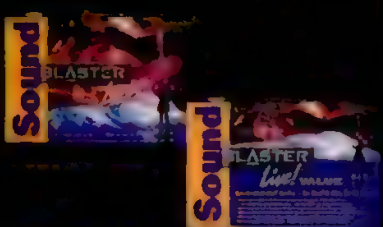
the Live! experience.

Go

Live the experience!

the Live! experience.

We're changing the way you think about your gear. We call it the Live! experience. It's a totally different way to interact with your PC. It's a totally different way to stimulate your senses. You'll be able to transform your ordinary PC into an extraordinary play center at an incredibly affordable price! Head on down to your local dealer and bring your PC to life TODAY!

	Product	Price	Music	Games	Movies	Work & Learn
AUDIO 	> Sound Blaster® Live!™	\$199**	●	●	●	
	> Sound Blaster® Live!™ Value	\$99**		●	●	
	> Sound Blaster® PCI128	\$69**		●		●
GRAPHICS 	> 3D Blaster® Banshee (AGP & PCI)	\$99** *		●	●	●
	> Graphic Blaster® Riva TNT (AGP & PCI)	\$169**		●	●	●
	> 3D Blaster® Voodoo2 12MB	Call Now!		●		
PC-DVD 	> PC-DVD® Encore 5x	\$249**		●	●	●
	> PC-DVD® Encore Dxr™ 2	\$199** *		●	●	●
SPEAKERS 	> DeskTop Theater™ 5.1	\$299**		●	●	
	> PCWorks® FourPointSurround™	\$99**		●		
	> SoundWorks®	\$99** **	●			●
	> PCWorks®	\$49** ***	●			●

* after \$30 mail-in rebate ** after \$50 mail-in rebate *** after \$20 mail-in rebate

● = best suited

● = good choice

CREATIVE

WWW.SOUNDBLASTER.COM

©1998 Creative Technology Ltd. All other brands or product names listed are trademarks or registered trademarks and are property of their respective holders. Unreal® 1998 Epic Megagames, Inc. All rights reserved. Created by Epic Megagames, Inc. in collaboration with Digital Extremes. Published and distributed by GT Interactive Software Corp. If you're not on the net, call 1.800.988.1000 for more information. All prices listed are estimated street prices and are subject to change without notice.

FIRST LOOKS

its score suffered slightly, dropping to 13.3. Its battery life is unexceptional, though, as the machine lasted 1 hour and 42 minutes on our BatteryMark measure.

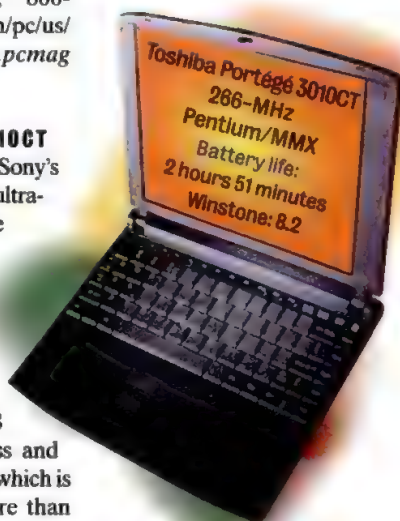
IBM ThinkPad 560Z Model BOU. Street price: \$3,800. IBM Corp., Somers, NY; 800-426-7255; www.ibm.com/pc/us/thinkpad; 414 at www.pcmag.com/infolink.

TOSHIBA PORTÉGÉ 3010CT

Following on the heels of Sony's revolutionary VAIO 505 ultrathin notebook comes the most interesting computer we tested in this miniroundup, the \$2,000 Portégé 3010CT, from Toshiba. This technological wonder measures but 0.8 inches in total thickness and weighs only 2.8 pounds, which is a scant few ounces more than some mininotebooks and Windows CE 2.1 devices that come to mind. But the machine's two-grand price tag means it likely will appeal to a tiny sliver of the mobile market, mainly ultramobile executives. Its features outstrip those of the VAIO 505, however, and its price is signifi-

cantly lower to boot.

When you're dealing with this size machine, the first thing to go is the keyboard. Witness the membrane keys on Hewlett-Packard's OmniBook Sojourn. We're happy to report that the 3010CT's 84-key key-



board is more like the Sony VAIO's: well-spaced enough and offering sufficient key travel to allow true touch-typing. Of course, it offers nowhere near the comfort of the ThinkPads' gourmet keyboards, but considering the size

of the 3010CT, it's pretty impressive. The one niggling issue we have is with the abbreviated Backspace key, which is conducive to misstriking the Home key and making a mess of your document.

The 3010CT's 10.4-inch TFT screen was another pleasant surprise, supporting SVGA resolution and providing crystal-clear pictures and acceptable off-axis viewing. You'll make no sacrifices in terms of memory or storage space either, as the 3010CT ships standard with 32MB of RAM (96MB maximum) and a 4GB hard disk.

The one area in which you will suffer, however, is connectivity. Though the 3010CT does feature on-board USB and 4-Mbps IR ports and dual PC Card slots (they are not stacked, however), it simply has no room for any old-fashioned port such as a parallel or serial connector. Say hello to the 8-ounce Port Expander Module (PEM), a necessary evil for any notebook of such waif-like proportions. This klunky dongle hangs off a proprietary port and provides parallel, serial, CRT, and PS/2 con-

nectors for anyone desperate enough to need them. We expect most users will probably leave the PEM at home and end up printing wirelessly and transferring data via sneaker-net or by attaching files to e-mails sent via the included 56-Kbps PC Card modem.

The 3010CT ain't no barn-burner, neither. This 266-MHz Pentium-based unit turned in a Winstone 99 score of 8.2 at SVGA resolution and 16-bit color, and 7.5 at 24-bit color. The notebook's size also means its battery is necessarily smaller, but it still managed to last an impressive 2 hours and 51 minutes on our Battery Mark test.

In general, the 3010CT is a design gem, but very specialized in its appeal, just as the 770X is at the other end of the size spectrum. And whereas the 560Z is perhaps the most elegant of our four test notebooks, its price and lack of an onboard CD-ROM drive also make it a niche product.

Toshiba Portégé 3010CT. Street price: \$2,000. Toshiba America Information Systems Inc., Irvine, CA; 800-867-4422; computers.toshiba.com; 415 at www.pcmag.com/infolink.

Xirlink's USB Camera Is Fit for Travel

Need a compact, easy-to-carry camera for videoconferencing on the road? Xirlink's C-It PC Camera—Model XVP-510 (\$90 street) may be just what you're after: The unit is bundled with its own complementary software: C-It Video Camera color-image capture program, C-It Mail video e-mail application, and C-It Album image-file storage and organization program. ArcSoft's PhotoImpression photo editor and Microsoft's NetMeeting for videoconferencing complete the C-It PC Camera bundle. Quick setup, fine image quality, and complete software at an attractive price add up to significant value.

The variable focus lens for the CMOS sensor-based camera has a range of 7mm to infinity. Still images in 24-bit true color are captured at a maximum resolution of 352-by-288 and are stored as BMP files. Image quality is adjustable with sliding controls for brightness and gamma settings. With the right settings for your lighting conditions, you get a clear color image with C-It that is viewable from full-screen size down to a 2.75-by-2.25-inch window.



The C-It camera doesn't have an integrated microphone, so if you want to use it for videoconferencing or video e-mail, you'll need to supply your own.

C-It Mail records AVI files at a resolution of 178-by-144 in a 2.75-by-2.25-inch window. You set video-image quality, frame-capture rate (up to 30 frames per second), and compression level. Video image and color quality are clear with no noticeable motion lag. C-It supports CIF, SIF, and QCIF standard video formats.

The C-It PC Camera and its applications are well designed, packaged and priced to make it easy to integrate digital image capture in your USB-ready computer.—*By Bruce Brown*
C-It PC Camera Model XVP-510. Street price: \$90. Requires: 16MB RAM, 8MB hard disk space, USB port, Windows 95 OSR2.2.1 or later or Windows 98; Xirlink Inc., San Jose, CA. 800-928-8008, 408-324-2100; www.xirlink.com. 416 at www.pcmag.com/infolink.

The P817 XtremeMonitor™

So Powerful,

It Benchmarks 360MHz

The P817 XtremeMonitor: Power and Speed

ViewSonic®, the market leader in Display Technology®, does it again with our new P817 XtremeMonitor. This well-built 21" (20.0" viewable) monitor is incredibly strong and fast, making it the best performance display available for high-end CAD, document imaging and other applications where absolute precision is required.

Flexing Its Specs

The ViewSonic P817, our flagship Shadow Mask monitor, is pumped up by some unbelievable numbers. Like a resolution of 2,048 x 1,536 at a rock solid 85Hz refresh rate (an industry first), and an amazing 360 MHz video input bandwidth that not only keeps up with the fastest high end graphics cards available, but delivers greatly enhanced front of screen performance.

Other features include a 4-port Universal Serial Bus (USB) hub allowing the quick connection of USB compliant peripherals like cameras, scanners, printers and more. Plus, a software driven OnView® display allows you to conveniently adjust the P817 via your mouse or keyboard.*

The ViewSonic P817 XtremeMonitor also includes ARAG® screen treatment to reduce glare, TCO '95 and Plug & Play, which supports easy installation under Windows® 95 and 98.

So don't settle for some 98lb. weakling. Instead, choose the leader in

performance, quality and craftsmanship.

The ViewSonic P817 XtremeMonitor.

For more information call ViewSonic at (800) 888-8583 and ask for agent 81356, or visit our website at: www.viewsonic.com/pcmag

ViewSonic P817
• 21" (20.0" viewable)
• 8.25 lbs. (16.5 lbs. total)
• 2,048 x 1,536
• 85Hz Refresh Rate
• 360 MHz Video Input Bandwidth
• 4-Port USB Hub



P817



GS71
March 1998



6810
January 1997



PT813
January 1998

ViewSonic Corp. Fax: (949) 369-7668

Specifications subject to change without notice. © Copyright 1998 ViewSonic Corporation. All rights reserved. For more information, please visit our website at www.viewsonic.com. *Requires OnView software. OnView software is available for Windows 95 and 98. OnView software is not included with the monitor. OnView software is available for Windows 95 and 98. OnView software is not included with the monitor. OnView software is available for Windows 95 and 98. OnView software is not included with the monitor.





Beyond Brilliant.



ViewSonic®
See The Difference!™

Choose 118 at www.pcmag.com/infolink

Make Your Move

Create high-end 3-D animations at a low-end price with MetaCreations' Poser 3.

By Luisa Simone

With the release of Poser 3, MetaCreations has made sophisticated character animation truly affordable. At \$200 (street), Poser 3 offers features found in high-end, high-cost animation products.

To a large extent, Poser 3's functions are made possible by a new class of fully articulated 3-D wireframes. The models include quadrupeds, plus male, female, and child figures.

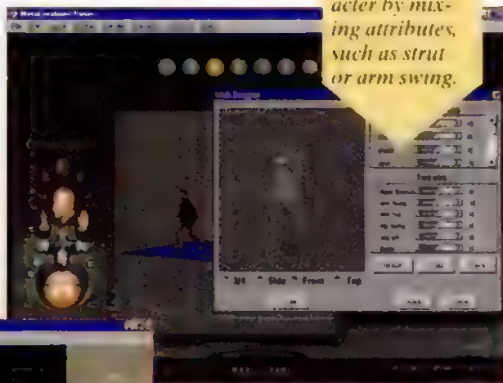
You can animate any expression—such

as movement but personality for your animated characters. You are not required to understand the mechanics of body movement; instead, a dialog box with a mannequin preview and slider bars let you blend different attributes, such as strut or run, to develop a walk. You can even apply a BVH motion capture file to a Poser 3 figure

trackballs, parameter dials, and drag-and-drop libraries. Die-hard CAD users will appreciate the option of still using Poser 2-style menus and dialog boxes.

Poser does have

STRUT: Poser 3's Walk Designer lets you model motion for a selected character by mixing attributes, such as strut or arm swing.



transitions between two walk sequences or to edit the multitude of keyframes associated with motion capture files.

Our testing uncovered incompatibilities with Adobe Type Manager and Windows 98 (when run at relatively low-resolutions, like 800-by-600). We could not, for example, open drop-down list boxes when working with Poser 3 figures until we increased video resolution. (Download the patch at the MetaCreations Web site to fix these problems.)

None of these

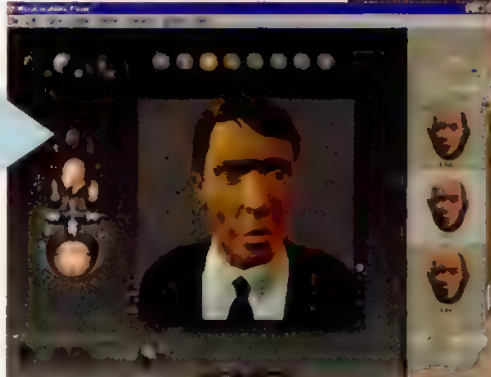
shortcomings are insurmountable. Used with a full-featured 3-D modeling and animation programs, Poser 3 can generate realistic animated characters at an amazing price/performance ratio.

Poser 3. Street price: \$200 (\$99 upgrade). Requires: 16MB RAM, 20MB hard disk space, Microsoft Windows 95, 98, or NT 4.0 or later. MetaCreations Corp., Carpinteria, CA: 800-846-0111; www.metacreations.com; 406 at www.pcmag.com/infolink.

SPEAK: Poser 3's articulated faces let you sync animated expressions to speech.

as right eyebrow up or frown—thanks to easily understandable controls. You can even make a character pronounce words by syncing an imported sound file (single-track only) to a series of facial poses.

Poser 3's Walk Designer gives you the power to create not just



for truly realistic movement.

In keeping with MetaCreations' tradition, the new interface is composed of virtual

collision detection, nor does it cap transformations to a range of normal body movements. We also found no easy way to create

Traffic Art with Windows Explorer

Mabango 2.0 (\$300 street) is an uncommon image-archiving program. Instead of presenting its tools in a standalone application, it extends the functionality of Windows Explorer.

Dragging, copying, or saving a file to a green archival folder enters the object into the Mabango searchable database and creates a thumbnail. Both the database and the thumbnails are integrated into Explorer. For example, thumbnails can be viewed in Explorer or in your graphics programs' Open and Save dialog boxes. And the database files are accessed through a modified Properties dialog.

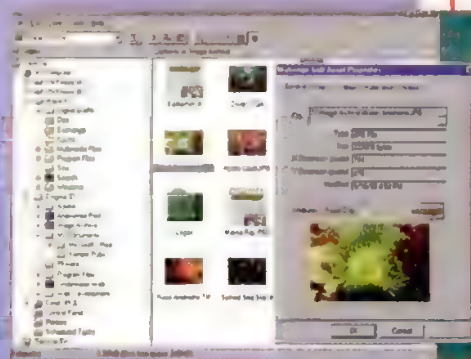
A blue Mabango project folder is an organizational device that contains proxy thumbnails that merely point to an archival folder. This approach allows you to store an image in multiple folders (for multiple projects) without wasting hard disk space.

Mabango tracks both digital and hard assets, like conventional artwork. Bar codes (which Mabango

can both read and generate) provide the link between the database and the external world.

We were troubled by several aspects of Mabango's performance, including its inability to prompt the user for removable media, database fields that can't be customized, and background thumbnail creation that slowed to a crawl on certain common formats. But Mabango doesn't require you to learn a new application, and it integrates seamlessly into your existing workflow.

Mabango 2.0. Street price: \$300. Requires: 8MB RAM, 14MB hard disk space, Microsoft Windows 95 or 98. Digital Graffiti Inc., Hamilton, Ontario, Canada; 888-308-9634, 905-308-9634; www.digitalgraffiti.com; 407 at www.pcmag.com/infolink.



ART DEALER: Mabango's folders, thumbnails, and database fields are integrated into Windows Explorer. The modified Properties dialog now includes archival information.



**We just
won't let you
go it alone.**

Buying business computers involves decisions about a number of complex issues. Not the kind of decisions a department store or mail order clerk can help you make. AST® wants you to build the computer system that perfectly fits your business needs. That's why AST computers are available only through Value Added Resellers—technology experts who specialize in turning our hardware products into your business solutions. They understand network and systems integration, web enablement and the many issues you face in making computers work for you instead of the other way around. Working with AST, your local VAR can combine

expert applications knowledge with superior PC hardware to give you complete solutions and a quality experience. Even with the most sensible PCs, business computing is a complicated process.

Call (800) 876-4278 for your nearest AST reseller—the expert with solutions to all your business computing needs. And visit our website at www.ast.com for more detailed product profiles.

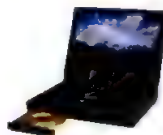
So remember: when there's an AST computer in front of you, there's someone at your side.

AST.
COMPUTER



Bravo Desktops

These high-productivity business PCs feature the fastest available Intel® chips—the Intel® Pentium® II processor 450MHz and 440BX AGPset—for outstanding system performance and graphics. Plus exclusive system noise reduction technology.



Ascentia™ Notebooks

Desktop video performance made mobile with blazingly fast 2X AGP 3D graphics and an Intel® Pentium® II mobile processor 300MHz. Unmatched security features are also included.



AST Premium® Servers

Maximum versatility and performance in a server that supports dual Intel® Pentium® II processors. Both running at up to 450MHz depending on the model. And, there's easy expansion with the best service, support and warranty programs.

(800) 876-4278 • AST Research, Inc. • 16225 Alton Parkway • Irvine, CA • 92618-3618 • www.ast.com

© 1998 AST Research, Inc. All rights reserved. AST, the AST logo and AST Premium are registered trademarks and Ascentia is a trademark of AST Research, Inc. Intel, the Intel Inside Logo and Pentium are registered trademarks of Intel Corporation in the United States and other countries. Specifications subject to change.



Finding Y2K Bugs

Norton 2000 Corporate Edition will identify potential Y2K problems throughout your network.

By Greg Alwang

Symantec has joined the year 2000 fray with Norton 2000 Corporate Edition (\$75 per seat), a Y2K tool designed to identify potential date issues in applications, data files, and PC BIOSs in distributed networking environments. The product doesn't fix Y2K date problems, but it annotates and helps prioritize date-sensitive areas in files and creates reports outlining specific date risks.

Norton 2000's data scanner is based on Viasoft's OnMark 2000 Assess, a powerful database and spreadsheet scanner that generates expandable reports using five configurable levels of Y2K severity. Norton 2000 scans Access, Clipper, dBase, Excel, FoxPro, Lotus 1-2-3, Paradox, and Quattro Pro files for date functions, formulas, macros, and other date-sensitive code.

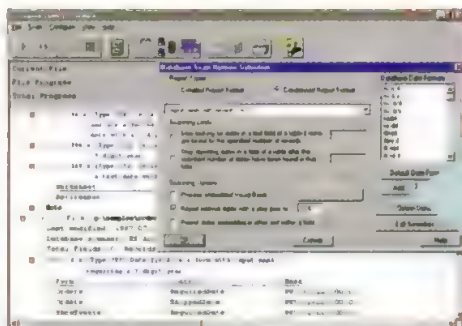
You can fine-tune your efforts by setting scanning options, such as whether to scan macros, or you can customize the severity levels depending on the way dates are used in your files. Reports can be summary-style or detailed down to the spreadsheet cell.

For Microsoft Excel 5.0 and later, Norton 2000 generates annotated copies of spreadsheets with color-coded date risks. Detailed comments are attached to potentially troublesome cells.

Norton 2000 scans embedded macros and Visual Basic modules for any date functions, conversions, variables, or arguments that suggest date usage. Also, you control which date formats to look for and whether to scan dates in label cells or text fields.

Norton 2000 scans databases for any text fields with two-digit years, and with Microsoft Access,

it also scans input forms, queries and reports for suspect date formats. For text or binary files, the software uses heuristic pattern matching to find problematic



SAVE THE DATE: Norton 2000 generates detailed reports of problematic date usage.

date formats, letting you scan source-code files or uncommon data formats.

The included Norton System Center (NSC) centralizes management and distribution of Symantec software. NSC runs on Windows NT and integrates into the Microsoft

Management Console. This gives administrators a single point for deploying and configuring Norton 2000, scheduling scans, and collecting results in a central database on the server.

In December, Symantec will

post a free online update, which will add application scanning, (where Norton 2000 matches client software applications against a central database of vendor compliance statements) along with compliance-reporting options. The existing diskette-based Y2K BIOS checker will be enhanced with a Windows-based

BIOS checker that can be centrally deployed on clients using NSC.

Norton 2000 Corporate Edition. List price: \$75 per node (volume discounts available). Requires: 10MB hard disk space, 16MB RAM, Microsoft Windows 3.1, 95, 98, or NT. Symantec Corp., Cupertino, CA; 800-441-7234, www.symantec.com; 411 at www.pcmag.com/infolink.

A Flat-Screen First

The first Sony flat-screen Trinitron monitor goes up against the LCD and CRT competition.

By Alfred Poor

The Sony GDM-F500, the first flat-screen Trinitron monitor to come to market, has features that compete with both LCD and large CRT displays. The 21-inch tube provides a 19.8-inch viewable image size—far larger than most LCD monitors—yet its street price of \$1,900 is lower than many smaller LCD monitors and is competitive with other 21-inch CRT models.

The large image size does not mean that you'll be limited to coarse, low-resolution images. Using a new HiDensity electron gun design, the monitor produces a smaller electron beam with higher energy levels than those of conventional designs, which in turn makes using a fine 0.22mm stripe pitch across the full width of the screen possible.

This fine pitch makes running the monitor at extremely high resolutions practical, right up to the maximum-rated 1,800 by 1,440 pixels, where it can still handle a flicker-freezing 85-Hz refresh rate. On our tests, the

image was sharp and well focused at 1,600-by-1,200, (our testbed's maximum resolution) though the Video Bandwidth Index as measured using DisplayMate (www.displaymate.com) was a bit low for this level,



at 69.4. It was a stronger 79.6 at 1,200-by-1,024 and an excellent 92.2 at 1,024-by-768.

The DisplayMouse's joystick-style control provides quick access to on-screen menus and is arguably the best in the business. The menus offer a wide range of adjustments including convergence controls. Our evaluation unit had some noticeable conver-

gence flaws that we all but eradicated using these controls.

The monitor has both 5-BNC coaxial cable connectors and a 15-pin mini D-sub connector on the back. A switch on the front lets you select the desired input source, but the auto-sensing monitor will select the active source if there is only one. The monitor also has one upstream and four downstream USB ports in its base.

On our tests with DisplayMate, the monitor showed excellent image quality with outstanding focus and rock-steady image-size regulation. Color quality was excellent, with no observable flaws in color tracking across a range of gray shades. If there's a flaw to mention, it is that the two tension wires behind the aperture grill casts faint horizontal shadows that some people may notice on a full-white-background screen.

At 70.5 pounds and just over 19 inches deep, the GDM-F500 won't fit on every desk, but it has the image quality to flatten the competition.

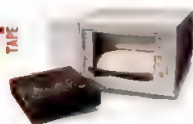
Sony GDM-F500. Street price: \$1,900. Sony Electronics, San Jose, CA; 800-352-7669; www.sony.com/displays; 410 at www.pcmag.com/infolink.



Protection from the inevitable



Business is a race. But if you're not careful, your data won't make it to the finish line. So protect yourself. Look for "DLTtape™" or the authorized DLTtape logo mark on all your backup drives and media. It means you have the real thing, designed to the real DLT™ standard. It means you've got one of the fastest, most reliable, most scalable data backup systems in the business. And it means your DLTtape drive warranty won't go head over heels. To find out more, visit our website at www.DLTtape.com. It could save you from a nasty headache.





LIFE IS SO MUCH EASIER WHEN YOU HAVE THE RIGHT SUPPORT.

A CDW account manager, your Direct Solutions Provider, can make life a whole lot easier. Because he's an expert, assigned to you personally and always there to help. Drawing from the top names in every computing category, like Compaq, IBM, Toshiba, Hewlett-Packard, Cisco and Microsoft, he'll build a computing solution just right for you. He'll ship it the same day and give you lifetime support too,

making CDW your one-stop resource for everything you need. No wonder we're the number one direct source for industry leaders including Compaq, Microsoft, IBM and many others. So call us today at 800-761-4239 or visit us at www.cdw.com. And see how much a billion dollar, Fortune 1000 company can help you. CDW. Solutions that make your job easier. And that puts you in the best seat in the house.



Computing Solutions Built for Business™

800-761-4239 www.cdw.com

© 1998 CDW Computer Centers, Inc.

AND SO MUCH HARDER WHEN YOU DON'T.





Computing Solutions Built for Business™

CDW SOLUTION

Your PC the way you want it

At CDW®, your dedicated account manager will use his expertise to custom-build a PC solution for you from the top names in every computing category. Start with Compaq's Deskpro EP desktop with its 333MHz Intel Celeron™ processor, 128KB Level 2 cache, 32MB RAM and 4.3GB hard drive. CDW knows Compaq like no one else—we're your #1 authorized direct source for Compaq! For high-quality color images and output, consider the Optiquest monitor and Epson inkjet printer. Check out CDW's web site at www.cdw.com with a modem and NIC from 3Com/U.S. Robotics, and e-mail us your comments with Microsoft's Office 97. CDW will install everything for you free of charge and in most cases, ship your order the same day. Order from CDW today and use it tomorrow.

**COMPAQ****Deskpro EP Series****\$946.81**

CDW 127792



Optiquest Q71
17" monitor
(16" viewable image size)

\$269.86

CDW 85004

**EPSON®**

Stylus Color 640
Color ink jet printer

\$199.00

CDW 125116

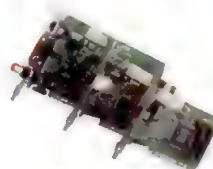
**3Com U.S. Robotics**

56K Faxmodem
V.90 compatible

Internal

\$127.99

CDW 107570



Fast
EtherLink XL
10/100 PCI
Ethernet adapter

3C905B-TX

\$88.74

CDW 107715

Microsoft®

Office 97
Standard Edition
For Windows 95 and
NT Workstation

Full version

\$458.57

CDW 78406

56K modems are capable of 56K bps downloads, however, current regulations limit download speed to 53K bps.

CDW® is your direct solutions provider for your every computing need.

800-761-4239**www.cdw.com**

©1998 CDW® Computer Centers, Inc. 200 N. Milwaukee Avenue, Vernon Hills, IL 60061 PCM4188C 11/3/98

CDW SOLUTION

You and your PC on the move...

**TOSHIBA****Satellite 4010CDT****\$2197.56**

CDW 128704

Your office address: Any place you need it to be. Let CDW® customize a PC solution for your mobile lifestyle. The Toshiba Satellite 4010CDT notebook packs what you need in a compact unit. It features a 266MHz Intel Pentium® II processor, 512KB Level 2 cache, 32MB RAM, 4GB hard drive, 24X CD-ROM drive, 12.1" active-matrix display and a 56K modem. We'll help you stay connected with a 3Com Fast EtherLink PC Card and pcANYWHERE32 V8.0 from Symantec. We'll even install them—our factory-trained technicians custom configure more than 2,500 computers every week! Pick up a Canon portable printer and protect your notebook with a Targus notebook case.


Canon®
BJC-80 Color Bubble
Jet™ printer
\$299.00

CDW 94630

TARGUS
Universal
Notebook case
\$69.99

CDW 19486

SYMANTEC
pcANYWHERE32 V8.0
For Windows 95 and NT
 Host and Remote
\$159.34

CDW 93317


Fast EtherLink XL
10/100 Fast Ethernet 16-bit PC Card
\$156.24

CDW 87717

CDW SOLUTION

Workgroup networking for power users

**COMPAQ**
ProLiant
1600 server
\$3125.02

CDW 130457

Your dedicated CDW network account manager has been trained to help you find solutions that will make your business operate more efficiently. For example, the Compaq ProLiant 1600 server with its powerful 450MHz Intel Pentium II processor, 64MB RAM, 100MHz GTL bus technology and Netelligent 10/100 Ethernet controller. Or 3Com's SuperStack line of hubs and Cisco Systems' 2501 router may be the networking component you need. As part of the CDW solution, we provide toll-free technical support for the life of your equipment. Call today and see why nobody does service better than CDW.


24-port SuperStack II
Dual Speed Hub 500
\$1039.80

CDW 106558


Cisco 2501
Single LAN/Dual WAN Router
\$1725.24

CDW 86418

**CDW is a Top 10 Compaq partner in server sales**

©1998 CDW® Computer Centers, Inc. 200 N. Milwaukee Avenue, Vernon Hills, IL 60061 PCMA188D 11/3/98

Choose 159 at www.pcmag.com/infolink
800-761-4239
www.cdw.com



AT BOLDATA, BUILDING SYSTEMS TO FIT YOUR NEEDS IS WHAT WE DO BEST!

BOLData Adventure Series Workstations

Built with Intel® Pentium® II processors, Pentium® processors with MMX™ technology, and Intel® Celeron™ processors

At BOLData, we're committed to providing the products and services you need. Like our Intel® processor-based servers and workstations. Built with Intel® Pentium® processors with MMX™ technology, Pentium® II processors and Intel® Celeron™ processors, our Adventure Series servers and workstations have the horsepower needed to run even the most demanding networking applications. BOLData Adventure Series systems have the room to grow as your needs grow. Whether you need pre-configured systems or custom configurations, BOLData has you covered. With an inventory of nearly 1,000 SKUs, we have the product knowledge, configuration experience and technical expertise to deliver some of the most reliable systems around. Systems, service and convenience. Choose BOLData as your partner for success.

Call us today.
1-800-923-BOLD.

ADVENTURE Star

- 440LX/EX AT AGP Motherboard
 - 32MB SDRAM
 - 3.2GB Ultra DMA Hard Disk Drive
 - 4MB AGP Graphics Adapter
 - 24X IDE CD-ROM Drive
 - Integrated 3D Sound Pro
 - 1.44MB Floppy Disk Drive
 - 56.6K V.90 HSP Voice/Fax/Modem
 - Mid Tower Case with 230 Watt Power Supply
 - Mitsumi 104 Key Enhanced Keyboard
 - Logitech Mouse
 - 120 Watt Stereo Speakers
 - Fully Tested and Burned In
 - **Microsoft® Windows 98 CD-ROM**
 - **3 Year Limited Warranty**
- | | |
|---|-------|
| Intel® Celeron™ processor 266MHz | \$625 |
| Intel® Celeron™ processor 300MHz | \$650 |
| Intel® Celeron™ processor 300MHz with 128KB Cache | \$715 |
| Intel® Celeron™ processor 333MHz with 128KB Cache | \$755 |

ADVENTURE Star - 2

- 440LX/EX AT AGP Motherboard
 - 64MB SDRAM
 - 4.3GB Ultra DMA Hard Disk Drive
 - **15" SVGA .28dp Monitor**
 - 4MB AGP Graphics Adapter
 - 24X IDE CD-ROM Drive
 - Integrated 3D Sound Pro
 - 1.44MB Floppy Disk Drive
 - 56.6K V.90 HSP Voice/Fax/Modem
 - Mid Tower Case with 230 Watt Power Supply
 - Mitsumi 104 Key Enhanced Keyboard
 - Logitech Mouse
 - 120 Watt Stereo Speakers
 - Fully Tested and Burned In
 - **Microsoft® Windows 98 CD-ROM**
 - **3 Year Limited Warranty**
- | | |
|---|-------|
| Pentium® II processor 300MHz with 512KB Cache | \$950 |
| Pentium® II processor 333MHz with 512KB Cache | \$999 |

ADVENTURE Ultra

- Intel® AL440LX AGP Motherboard with USB
 - 64MB SDRAM
 - 6.4GB Ultra DMA Hard Disk Drive
 - **15" SVGA .28dp Monitor**
 - 8MB AGP 3D Graphics Accelerator with Intel i740 Chip
 - 32X IDE CD-ROM Drive
 - Integrated Yamaha OPL3-SA3 Audio
 - 1.44MB Floppy Disk Drive
 - 56.6K V.90 Voice/Fax/Modem
 - Mid Tower Tool-Free Case with 235 Watt Power Supply
 - Mitsumi 104 Key Enhanced PS/2 Keyboard
 - Microsoft® PS/2 Mouse
 - 120 Watt Stereo Speakers
 - Fully Tested and Burned In
 - **Microsoft® Windows 98 CD-ROM**
 - **3 Year Limited Warranty**
- | | |
|---|---------|
| Pentium® II processor 300MHz with 512KB Cache | \$1,139 |
| Pentium® II processor 333MHz with 512KB Cache | \$1,189 |

ADVENTURE Xtreme

- Intel® SE440BX Motherboard with USB
 - 64MB PC100 SDRAM
 - 8.4GB Ultra DMA Hard Disk Drive
 - **17" SVGA .28dp Monitor**
 - 8MB AGP 3D Graphics Accelerator with Intel i740 Chip
 - 2X DVD-ROM Drive with MPEG II Decoder Card
 - Integrated Crystal 3D Audio
 - 1.44MB Floppy Disk Drive
 - 56.6K V.90 Voice/Fax/Modem
 - Mid Tower Tool-Free Case with 235 Watt Power Supply
 - Mitsumi 104 Key Enhanced PS/2 Keyboard
 - Microsoft® PS/2 Mouse
 - 120 Watt Stereo Speakers
 - Fully Tested and Burned In
 - **Microsoft® Windows 98 CD-ROM**
 - **3 Year Limited Warranty**
- | | |
|---|---------|
| Pentium® II processor 350MHz with 512KB Cache | \$1,545 |
| Pentium® II processor 400MHz with 512KB Cache | \$1,749 |
| Pentium® II processor 450MHz with 512KB Cache | \$1,975 |

Copyright © 1998, BOLData Systems Inc. Pricing and specifications subject to change without notice. BOLData the BOLData logo, Adventure Star, Adventure Star-2, Adventure Ultra and Adventure Xtreme are trademarks of BOLData Systems. Intel, the Intel Inside logo and Pentium are registered trademarks and MMX and Celeron are trademarks of Intel Corporation. All other product or company names are the trademarks or registered trademarks of their respective owners.



BOLData™
S Y S T E M S
800-923-BOLD

8363 Fremont Blvd. • Fremont • CA • 94538

Choose 136 at www.pcmag.com/infolink

PM981103

Use Your Voice

Veritel's VoiceCrypt uses your unique voiceprint to protect the files on your PC.

By Stephen W. Plain

When it comes to security, biometric solutions are the wave of the future. This emerging technology is still in its infancy, but Veritel Corp.'s VoiceCrypt 2.01 (\$50 street) delivers inexpensive file security based on your unique voiceprint.

VoiceCrypt guarantees that only you can run applications that you've encrypted with your personal voiceprint. According to the vendor, this voiceprint is based on an estimated shape of your vocal tract, which is registered during your brief enrollment process.

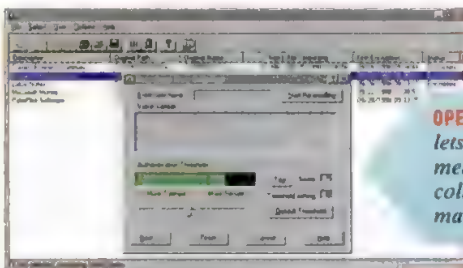
Each time you access the VoiceCrypt program or its protected documents, you're asked to pronounce your name and answer one of the five questions you were asked during enrollment. You can also access your files by typing the answer to four personal questions. Or you can assign a one-time password, and the program issues a separate emergency password during installation, which can be used from the command line to get you into the program.

The VoiceCrypt user interface displays a list of the encrypted files (called a *collection*) and a toolbar with small icons. You can add programs or documents to the collection by dragging and dropping them or through the menus and toolbar.

You can choose to encrypt the files in place (using a proprietary 256-bit algorithm) or move them to a "vault" in the program's directory with a scrambled filename. If you choose the former, the original executable is replaced by a file with a V added to the extension. Once the file is renamed, a new executable is copied to the original EXE filename that will

launch VoiceCrypt to authenticate the user.

VoiceCrypt did a great job of



some false rejections of our authorized tester as well. We found that a minor tweak of the program's sensitivity and a more consistently spoken enrollment made the program more reliable.

We did find a few limitations to VoiceCrypt's functionality, however. We couldn't drag shortcuts into the collection—only origi-

OPEN SESAME: Veritel's VoiceCrypt lets you add your sensitive documents and applications to its collection and requires a voice match to open them.

rejecting unauthorized users from our test system—a Pentium MMX/200 with 64MB of RAM—but we experienced

nal files. The program also automatically changed document icons, making it hard to distinguish quickly between document types. Finally, we

looked in vain for a feature to protect Windows log-ons or system boots.

This version of the program is limited to single-user use, but the company will release a free upgrade to a multiuser version in the first half of the new year. All in all, VoiceCrypt is a great alternative to passwords as a way of protecting your files.

VoiceCrypt 2.01. Street price: with microphone until March 31, 1999, \$50. Requires: 16MB RAM (32MB for NT), 10MB hard disk space, Microsoft

Windows 95, 98, or NT 4.0 or later. Veritel Corp., Chicago; 888-837-4835, 312-382-1188; www.veritelcorp.com; 408 at www.pcmag.com/infolink.

Web Neighborhoods

Interactive Toaster's free MemberSites can turn your home page into an online community.

By Jim Lynch

Community has always been an important part of the online experience. With the success of the Web, personal home pages have become a hot commodity. As a result, we're now starting to see a new breed of online community.

One such community is Interactive Toaster's MemberSites, which is user created and managed and includes the basics of online interaction, such as chat rooms, newsletters, events calendars, message boards, member directories, and photo albums. MemberSites also includes publishing tools and community-management features.

To start our own online community, we registered via a simple form and then proceeded to build our site. Setup was easy; we were able to customize the name of our site, our welcome

messages, and our time zone.

We were also able to choose from a wide selection of site graphics, but we couldn't upload our own for the site itself, although we could add graphics to our photo album.

Once we had the basic pieces of our site in place, we started

playing with the interactive and publishing elements. First we created a newsletter. You can choose an HTML-formatted newsletter (for those who prefer to do the coding themselves) or a less-advanced option that let

WELCOME HOME: MemberSites offers users the ability to manage their own communities with features such as events calendars, newsletters, chats, and bulletin boards.



us add text and graphics without knowing HTML.

We then set up an events calendar. The calendar, which has month or year views, can be updated at any time, and we found setting up events quick and easy.

MemberSites' Web-based bulletin boards are somewhat primitive compared with the more elegant examples found on services such as CompuServe. The lack of real threading is a disadvantage, and we noticed that bulletin board pages loaded slowly over a dial-up connection. We did appreciate, however, the option to e-mail replies about a specific topic.

MemberSites also comes with a standard chat room, which doesn't provide avatars or other graphic chat elements but should serve the needs of most users. MemberSites also offers users an instant messaging capability.

MemberSites is part of the new wave of products that empowers users to build their own communities. Stop by MemberSites: You might just find yourself moving into the neighborhood. **MemberSites.** Price: Free. Interactive Toaster Company Inc., Boca Raton, LA; www.membersites.com; 409 at www.pcmag.com/infolink.

SONY

This is
your camera.



This is
your film.



This is
your post office.



Now, E-Mailing the Sights and Sounds of Your Life
Has Never Been Easier.

Digital Mavica®

NEW MVC-FD81



•XGA Resolution (1024x768)



•Voice Memo Mode



•MPEG Movie Mode

- E-Mail Mode •Whole Disk Copying •Quick Access 2x Floppy Disk Drive
- 3x Optical Zoom •2.5" Color LCD With Solar Window™ Panel
- Compatible With Virtually Any Computer* •Built-in Intelligent Flash
- Free One-Year Membership* to Sony's ImageStation™ on PhotoNet*



It's As Easy As A **Floppy™**

www.sony.com/mavica <http://imagestation.sony.com>

©1998 Sony Electronics Inc. All rights reserved. Reproduction in whole or in part without written permission is prohibited. Sony, Mavica, Solar Window, and It's As Easy As A Floppy are trademarks of Sony. PhotoNet is a registered trademark of PictureVision. *Internet access required, not included. A \$19.95 value. Must redeem by 8/1/99. ImageStation is a service mark of Sony Electronics Inc.

Managed Power

The IBM Netfinity adds excellent diagnostics and management to its Xeon-based enterprise server.

By Stephen Chan

In our previous issue's From the Bench, we tested the first pair of four-way, 400-MHz Xeon servers released after Intel's chip delays. On their heels comes the IBM Netfinity 7000 M10 (\$49,958 list as tested), an enterprise-level server comparable to the Compaq ProLiant 6000. Though the Netfinity delivers nearly identical performance, it stands out by offering extra

pluggable, compared with the Compaq's nine. The Netfinity, however, lacks Compaq's top-panel trapdoor for easy access. As with the Compaq server, the Netfinity includes standard high-availability features, including redundant, hot-swappable fans and power supplies.

As part of IBM's effort to promote the Netfinity as a complete server system, it includes a remote server management adapter—the Advanced System Management (ASM) PCI adapter—standard, whereas most enterprise-class servers make it an option. The separate adapters have the benefit of their own power supplies, letting them control the server even if it loses power or crashes. The ASM ties in with IBM's Netfinity Manager software, though we were a little

disappointed with its OS/2-style interface. A revised GUI will be available early next year.

IBM's unique Light Path technology eases troubleshooting. There are Light Path LEDs for every DIMM, processor, and PCI slot. These lights are used in conjunction with the ASM and Netfinity Manager software. For example, we simulated a DIMM problem, and the alert told us to look for the Light Path alert on the memory board; the lit LED lead us easily to the problem slot.

The Netfinity matched up well with the Compaq ProLiant 6000. Under ServerBench 4.01, they produced nearly identical results. The Netfinity comes with faster ECC EDO DIMMs, but that difference didn't manifest itself on our tests. The product includes three years of on-site service and round-the-clock free technical support.

IBM Netfinity 7000 M10. List price as configured: \$49,958. IBM Corp., Somers, NY; 800-426-7255; www.ibm.com/netfinity; 400 at www.pcmag.com/infolink.

ENTERPRISE POWER:

The IBM Netfinity 7000 M10 offers power and excellent management capabilities.

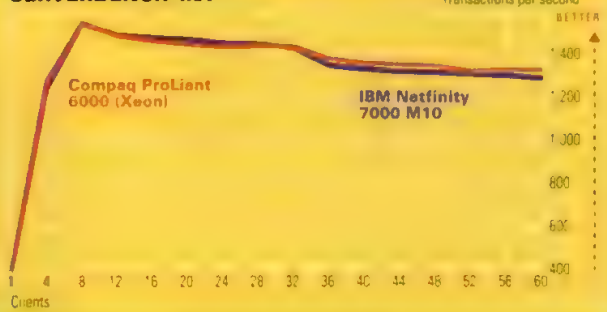
management capabilities.

The Netfinity is available either rack-mounted or fitted in a tower kit with a Netbay 3, a 3U mobile rack that holds the server and drive cages, UPSs, or RAS hardware. An optional EXP10 external unit can hold up to ten 1- or 1.6-inch drives of 4GB, 9GB, or 18GB capacity. You can wheel-mount a stack of three Netbay 3s with the server for a neatly packaged solution.

Our test unit was loaded with nine 10,000 RPM Seagate Ultra-2-Wide/Low Voltage Differential SCSI (U2W/LVDS) drives (five in an EXP10, four in the Netfinity itself). All were connected via the optional ServeRAID 3H Ultra2 SCSI Adapter, a three-channel, 64-bit PCI controller with 32MB (64MB maximum) of cache.

Access to serviceable parts is easy and tool-free. You reach memory and processors through the front of the system. A maximum of two memory cards with 32 DIMM slots holds up to 8GB of ECC EDO memory. Impressively, all twelve PCI slots (five 64-bit, seven 32-bit) are hot-

SERVERBENCH 4.01



Modems Go USB

MultiTech is first to market with a V.90 modem that connects via the USB port.

By Steve Rigney

The debut of the MultiTech MultiModem USB (\$259 list) marks the beginning of the end for head-scratching modem installations. In addition to hot-pluggable capabilities, USB modems offer better flexibility and performance, and because they get their power from the USB port, you can say good-bye to external power supplies. And although the USB's 12-Mbps throughput is overkill for a 56-Kbps modem, it lets you attach up to 127 devices in a single chain to share that speed.

The MultiModem package includes the modem, a

4-foot USB cable, drivers for Windows 95 and 98, and a CD-ROM with Trio DataFax/Voice Communications 5.3 software.

Though the modem was a breeze to install on a Windows 98 system, we had problems under Windows 95. Windows 98 automatically detected the new modem, installed the correct driver, and found a free communications port. But if you're running a pre-OSR2 version of Windows 95 as we were, you'll find the OS can't detect USB devices properly. In testing,

the modem successfully made V.90 connections at about 48 Kbps, which is average for 56K modems.

If you're running Windows 98, you also have the benefit of multilink PPP, which lets you aggregate modem connections into a single pipe. A USB modem is a fine way to add additional bandwidth to a system with an existing modem; we successfully added the MultiTech unit to a laptop with two PC Cards and one external modem already installed.

Although Windows 95 and 98 comes with plenty of communications software, the bundled Trio program is a nifty addition. It can handle most communications needs and includes an answering machine feature that lets your PC store voice mail. The MultiTech unit can store four predefined phone numbers for speed-dial, includes Caller ID functions, and offers remote-configuration capabilities.

MultiTech MultiModem USB. List price: \$259. MultiTech Systems Inc., Mounds View, MN; 800-328-9717, 612-785-3500; www.multitech.com; 401 at www.pcmag.com/infolink.



HOT PLUG: The MultiModem USB is the first hot-pluggable modem.

Your Personal PBX

Compaq gives you powerful communications capabilities on the desktop.

By Valerie Guzman

If your business telephone phone never stops ringing and you crave call-management and control features, the Compaq Microcom 705 Corporate Communicator (\$350 street) is for you. The Communicator is an integrated digital modem and communication organizer that interfaces directly with your PBX. The combination ISA card/software package installs in Windows 95 PCs (Windows 98 and NT versions should be available by press time) and eliminates the need to provide separate analog lines for fax or data to the desktop.

Although telecom vendors such as Nortel offer similar devices, each device typically works with a specific vendor's PBX only and lacks an integrated digital

modem. Compaq's product works with the top three PBX vendors and their corresponding digital phones, even in mixed environments, which is a plus for companies with multivendor telecommunications networks. We were disappointed that the Communicator didn't support the popular Lucent 8400 series phones, but a free flash upgrade should be available when you read this.

The Communicator hardware is a full-size ISA card with two RJ-45 ports, one to connect to the phone and the other to the PBX. Installation was fairly straightforward but required several reboots. Though this is a minor nuisance for a single in-

stallation, installing a dozen or so could result in a considerable time sink. Excellent documentation and an easy-to-follow wizard guided us through software installation, and we were placing calls in 20 minutes.

We were particularly impressed by the phone book and

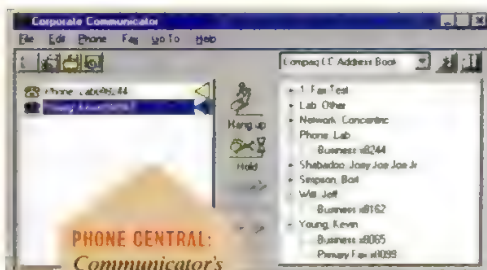
fly as you receive calls.

A call log keeps a running list of all incoming and outgoing phone calls and faxes. If your PBX supports Caller ID, the log will even capture the phone number of callers that you don't catch before they hang up or go to voice mail.

The integrated modem lets you place data calls through the PBX, eliminating the need to order expensive analog lines for the office. It also means you can fax directly from your desktop and keep a log of all your data transactions.

The only downside is that you can't place data calls within the Communicator software; you have to use Windows Dial Up Networking.

Compaq Microcom 705 Corporate Communicator. Street price: \$350. Compaq Computer Corp., Houston; 800-652-6672; www.compaq.com.



screen pop features. The phone book holds the

typical names and numbers, plus personal information, notes, and file attachments. Turn on the screen pops and these entries automatically pop up whenever someone calls, letting you update the person's entry on the

Network Bouncer

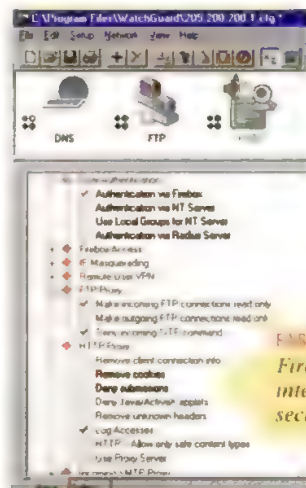
Watchguard's Firebox II provides an easy-to-use network security solution for everyone.

By Robert P. Lipschutz

For small- to mid-size companies, the complexity of network security issues makes them ominous. WatchGuard Security System v3.1 with Firebox II (\$4,995 list) helps eliminate the mystery around firewall security with a turnkey appliance, providing an easy-to-use and powerful configuration interface. In addition, the Firebox II delivers extras such as Virtual Private Network (VPN) capabilities and simplified updating.

The Firebox II is an all-in-one red box with built-in firewall software. It has two 10/100 Ethernet ports to connect your trusted and external networks, plus an optional 10/100 port for the demilitarized zone (the network segment where you place your Web and e-mail servers).

You install and configure the



unit through either a Windows 95 or NT PC connected over the network or by the Firebox II's serial port. The unit comes with a predefined IP address, but if it conflicts with your network, you can change it over the serial con-

nection. A wizard walks you through configuration, and a useful worksheet helps organize IP addresses. Upon installation, you perform all management through a Windows-based interface.

We were impressed with the Firebox II's penchant for doing the right thing. When you add a service to your network, the Firebox II automatically configures itself to deny incoming and allow outgoing traffic, the way most network administrators want the configuration to be. The interface is clean and intuitive, and each of

the 28 services such as HTTP, FTP, and Real Networks, is clearly docu-

mented on-screen and in the manual as to their uses and specific security concerns. The default settings held up to several attempted attacks we made against the product.

The FireBox II handles both incoming and outgoing data packets, letting you manage

users' Internet access while keeping out trespassers. A HTTP proxy can read any outgoing request and let you block out Java or specific Internet sites, or you can just let all traffic go through.

The Firebox II includes the firewall-side software for both point-to-point and dial-in VPNs. It uses the Microsoft Point to Point Tunneling Protocol (PPTP) as the desktop client, so any Windows 98 or NT user already has the client installed.

WatchGuard's Live Security technology eases the update process by bringing an antivirus update model to security. The Firebox II configuration is stored on updatable flash memory; when a new security patch becomes available, you simply download it.

WatchGuard Security System v3.1 with Firebox II. List Price: \$4,995. WatchGuard Technologies Inc., Seattle; 888-682-1855, 206-521-8340; www.watchguard.com; 402 at www.pcmag.com/infolink.

High Quality, Lower Price

Intel's low-priced ProShare Video System 500 opens high-quality videoconferencing to new markets.

By Les Freed

Designed specifically for powerful systems—Pentium II/266 and better—the Intel ProShare Video System 500 leverages that CPU power to provide excellent picture quality for H.320 ISDN and H.323 LAN videoconferencing. Although the product boasts better video and easier setup than earlier versions, the big news here is the price. At \$799 (list), Intel has made high-quality videoconferencing available for smaller offices.

The ProShare package includes a camera, headset, desktop microphone, and a single PCI card that provides video capture, ISDN connectivity, and audio input and output. If you have an ISDN line, you can use the ProShare to make voice and standard Group 3 fax calls, or you can connect to an ISP using Windows 95's Dial Up Networking or Windows NT's Remote Access Services. A second video input on the back of the card lets you connect an additional camera or a VCR.

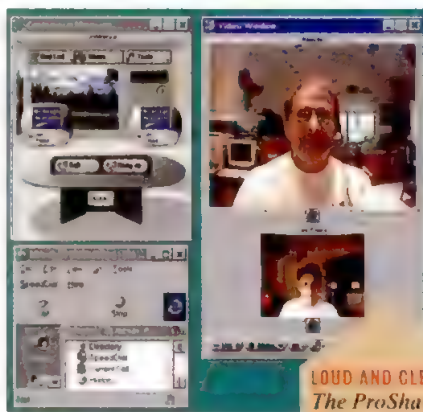
Hardware setup was a breeze. We installed the Plug-and-Play PCI card, then set up the manual-focus camera, by simply attaching a self-stick base to the top of our monitor and snapping the card in. The base tilts and swivels, letting you point the camera in any direction. It provides a relatively wide field of view and includes a privacy cover, even though the camera is only active during a call. There are buttons and a slide switch for adjusting brightness, contrast, and white balance. The Intel ProShare Video System 500 card also provides the camera power, eliminating the need for an external transformer.

Software installation took about 10 minutes. The current version runs on Windows 95 and

NT Workstation 4.0 only, but a Windows 98 version should be finished by press time. The first time the software runs, it performs collaboration tests on the system. If you have a 400-MHz or better CPU, ProShare enables software-based deblocking features that we found noticeably reduced the blocky appearance of moving subjects. You can also adjust the local and remote picture via slider controls in the software. We found the videoconferencing software simple to use. It provides a unified dialing directory where you can store voice, H.320 phone numbers, and H.323 IP addresses, and Microsoft NetMeeting for docu-

ment-sharing functions.

We were impressed with the ProShare's picture quality, especially when we connected two 400-MHz Pentium II systems using H.323. The picture was



sharp and the motion smooth. More important, the audio was closely synched with the picture.

We found some minor annoyances, however. The ProShare doesn't provide automatic switch type (or SPID) detection for

your ISDN line. You'll need to enter the information manually, but the process is clearly laid out in the documentation. Because the ProShare uses an ST ISDN interface, you must use the included Windows NT-1 U interface adapter, which adds cable clutter and takes up a second AC outlet. Finally, unlike most ISDN terminal adapters, the included adapter doesn't provide a POTS jack, which means you can't use a standard phone, answering machine, or analog modem over the ISDN line. Though you need to place all voice calls using the headset or microphone, audio quality is loud and clear.

Intel ProShare Video System 500. List price: \$799. Intel Corp., Hillsboro, OR; 800-538-3373; www.intel.com; 403 at www.pcmag.com/infolink.

Connect, Share, Surf

The Prestige 100MH lets you create an Internet-connected home or small-office LAN in 10 minutes.

By Les Freed

With the exception of NICs and cables, the ZyXEL Prestige 100MH Router/Hub/Modem (\$330 street) packs everything you need to create a home or small-office LAN of four Inter-



net-connected PCs. The Prestige 100MH combines a 56K V.90 modem, an IP router, and a four-port 10Base-T hub in one compact, easy-to-use box, but if you

future plans include expanding your network or upgrading to Fast Ethernet, look elsewhere.

To test the device, we set up a home LAN consisting of two PCs, each with NICs already installed. We connected the systems to the Prestige 100MH's hub and plugged in the phone line and power cords. Next, we fired up ZyXEL's Java-based Prestige

ALL-IN-ONE: The Prestige 100MH can jump-start an Internet-connected small network.

Web Configurator (PWC). We typed in our ISP's phone number and account information when prompted and had an Internet connection in 10 minutes flat.

The Prestige 100MH uses a version of Name Address Translation (NAT) to provide Internet access for multiple PCs

through a single, dynamically assigned IP address. The device also includes a built-in DHCP server for automatically assigning client IP addresses.

The Prestige 100MH dials your ISP on demand and automatically disconnects after a user-defined period of inactivity. The included V.90 modem provided connections of between 40 to 50 Kbps during testing.

The box has plenty of useful status LEDs, and the management software provides excellent status, call-monitoring, and troubleshooting features. The Prestige 100MH's only shortcoming was the 10-Mbps hub. It won't be able to grow with your network if you upgrade to Fast Ethernet and also lacks an uplink port, requiring a crossover cable to add a second hub for more PCs.

ZyXEL Prestige 100MH Router/Hub/Modem. Street price: \$330. ZyXEL Communications Corp., Placentia, CA; 800-255-4101; www.zyxel.com; 404 at www.pcmag.com/infolink.

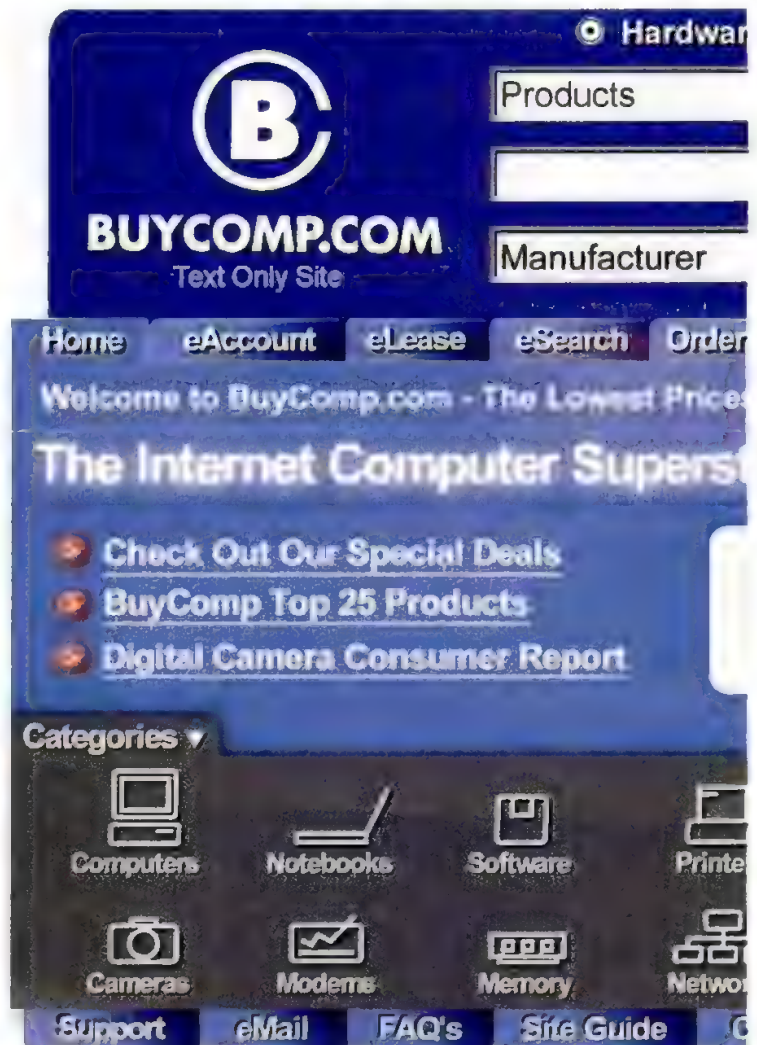
Why Buy Any

The #1 Internet Co

Search 130,000 top computer hardware and software products with the guaranteed lowest prices on earth.

Link to daily specials for extra savings, free promotions, product bundles, and BUYCOMP.COM's top 25 best sellers.

Link to specific product categories like buycomputers.com, buynotebooks.com, buymonitors.com.



The Lowest P

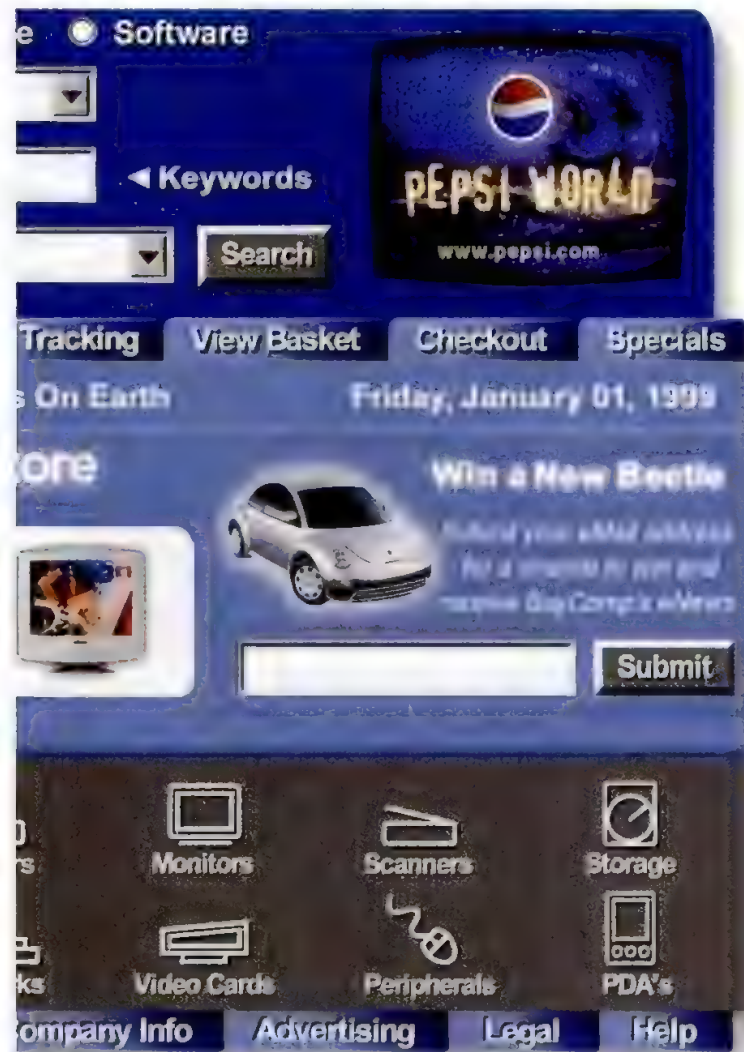
BUYCOMP.COM, The Internet Computer Superstore, passes the savings onto our customers with the guaranteed lowest prices on earth. Shopping online is fast and convenient - orders can be placed within minutes and delivered to any home or office. Our

Order online today... ...receive it tomorrow*

*orders specified next day delivery that are received before 4 p.m. PST with the item in stock. 1998 Copyr

Anywhere Else.

Computer Superstore



Upper navigation bar allows customers to establish an eAccount, learn eLeasing options, and get order tracking and checkout information.

Win a Volkswagen New Beetle every 90 days and receive eNews with great deals and company updates. Submit your email now for a chance to win!

Lower navigation bar allows customers to link to customer support, email BUYCOMP.COM, find company information, or get answers to the most frequently asked questions.

Prices On Earthsm

superior customer service representatives stand ready to answer any questions by email or phone quickly and efficiently. This is why BUYCOMP.COM is the fastest growing Internet company in America's history.



BUYCOMP.COM
The Internet Computer Superstoresm

Order online anytime at **www.buycomp.com**
Order by phone toll free **888-880-1030**

Waiting for the Tools

By Jan Ozer

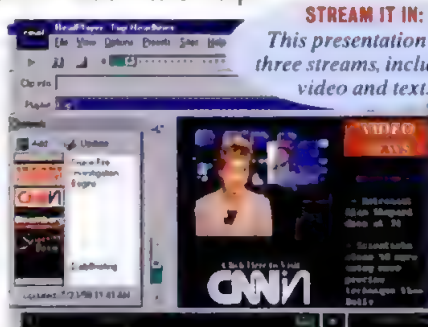
RealNetworks' latest G2 beta release, RealSystem G2, showcases the company's aggressiveness in developing and acquiring the latest in cutting-edge streaming media technologies. Real has made little progress on its Synchronized Multimedia Integration Language (SMIL) generation applications, however, leaving third-party tools to fill the gap.

The most dramatic new addition to the company's arsenal is new video compression technology licensed from Intel. Although our tests showed little—if any—quality improvement,

encoding times dropped to significantly less than the clips' playing times on our 350-MHz Pentium II test machine.

The speed boost enables real-time broadcasts using Real's SureStream technology, which combines multiple-bandwidth streams into one file. This eases server administration by letting one file service multiple-bandwidth clients, and it also lets RealServer optimize video quality for each client by dynamically adjusting dataflow as line conditions change.

Real has also introduced a new audio codec tuned for low-bandwidth content, which we tested with a range of clips encoded from 6 to 20 Kbps.



STREAM IT IN:

This presentation has three streams, including video and text.

At 6 Kbps, the encoder produced excellent quality with files containing voice and music, though quality degraded somewhat with music-only clips.

But in both audio and video quality, G2 was roughly equivalent to Real's main competitor, Microsoft NetShow.

RealNetworks' encoder, a work in progress during our last review, has evolved into a polished, intelligent program. SureStream producers will appreciate the customizable presets for a

range of connection speeds, and those serving legacy clients will value the ability to set a preference that ensures compatibility with RealPlayer 5.0.

The company has made little progress, however, in demystifying the creation of SMIL files that leverage G2's new RealPix and RealText formats. Though third-party tools such as Digital Renaissance's T.A.G. Author enable SMIL production, Real has pledged to complete its own SMIL presentation wizard before shipping G2. Since SMIL is one of G2's most significant competitive advantages, this remains the most obvious prerelease hurdle to be cleared before G2's final release.

At 20 Kbps, low enough for 28.8-Kbps connections, most music and voice content were virtually indistinguishable from the origi-

tioned here is the VAIO 505-GX's lack of disk space. This situation is exacerbated by the number of programs and utilities that Sony preloads on the system, many of which some here found nonessential. One participant questioned Sony's decision to load both Microsoft Money and Quicken, as both programs perform the exact same functions.

But no matter how you may feel about the Sony VAIO 505-GX, you have to admit it's different, and it's affordable.

Trend-Setting Ultraportable

By Carol Venezia

Everyone who sees the Sony VAIO 505-GX for the first time has pretty much the same reaction to it: exclamations of "ooh," "wow," and "cool." And what's not to love about it at first glance? If you're a PC user who's used to beige cases, this metallic-silver and purple number will definitely grab your attention.

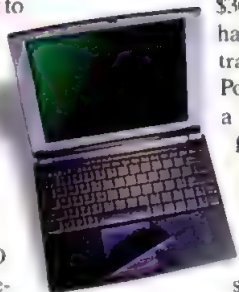
Among those VAIO owners who posted responses on our Web site (www.secondlooks.com), the take on this superslim notebook was overwhelmingly positive. But one sentiment that was expressed by a few of you struck us: The Sony VAIO 505-GX is really the first affordable ultraportable on the market.

Traditionally, there's been a steep premium attached to sub-notebooks. The HP OmniBook Sojourn and the IBM ThinkPad 600 were both mentioned as possible lightweight alternatives, but with prices ranging from \$4,000 to \$5,000 and up, many cannot afford them. Sony has brought ul-

traportable computing down to the affordable level—at well below \$3,000. But Toshiba will likely give Sony a big run for its money with the new Portégé 7000: For an extra \$200 to \$300 and at about half a pound of travel weight, the Portégé gives you a bigger screen, a faster processor, more memory expansion, better battery life, and double the storage space.

Perhaps not surprising, the minor gripes that some had with this notebook related directly to its small size. Number one on this list was key travel, which some respondents found not generous enough. After using this notebook, we'd definitely have to agree that the 90 percent keyboard does take some getting used to. Others commented on the VAIO 505-GX's short battery life. Our testing backs this up; the VAIO 505-GX lasted just 90 minutes on our BatteryMark test.

Another minor and somewhat fixable drawback men-



www.secondlooks.com

Tell us what you think...How do you like the new products you're using? Second Looks is your forum for feedback. Join us online to tell us about your experiences. We discuss a different new product every week and summarize your comments here. Below are just a few of the comments from our discussion of RealNetworks' G2.

Microsoft's Media Player far surpasses RealNetworks' G2. As with all of Microsoft's products, Media Player is just plain a superior product: Its functionality and ease of use put the G2 player to shame. The only reason people consider the G2 player is because of Microsoft-bashing, without such an illogical bias there would not even be a discussion.

—Christian Buss

Media Player is like every MS product—it takes control of things you don't want it to, and it is rather risky to install, uninstall, and use. RealPlayer was always the opposite, a well-made and well-behaved free program, despite some of its shortcomings, most of them concerning its lack of playback versatility.

—Paris Pasvantis

**YOUR
brands.
YOUR way.
NEXT day.™**

It's Simple.

We stock hundreds of
brand-name computers.

We'll custom-configure your new PC
Free of Charge.

And we'll ship it to you
Overnight.



PC Connection[®] More Choices. For Less!

Brand-Name Computers.

You want selection. We've got it! Hundreds of brand-name computers from Compaq, IBM, Hewlett-Packard, Toshiba, Hitachi, Digital and Fujitsu. The latest models with blazing-fast Pentium II speeds up to 450MHz. Plus all the features you want most, like spacious hard drives, built-in CD-ROMs, network connectivity, advanced graphics support and more. You want it, we've got it!

FREE Custom Configuration.

Just tell us what you want. We'll custom-configure your new PC at no additional charge! Need more RAM, a Zip Drive, faster modem, graphics card, NIC Card or DVD-ROM drive? Hey, no problem! Our expert technicians will even install the software on your new PC and test the entire system before we ship!

Next Day Delivery.

We know you want your new PC fast! We'll ship your new custom-configured PC for delivery next day. Even when you order by midnight you'll still get it the next day! Plus we even deliver on weekends! It couldn't be easier—or faster!

All this! Plus the Hottest Deals!

Best of all, when you order from PC Connection, you'll always get the lowest price possible! For even more savings, check out our Exclusive Deals on PCs, peripherals and software!

See pages 360 & 361
for additional listings

**NEW! 300MHz
Complete System!**

**Computer, Monitor,
Scanner & Printer!**

PC Connection[®] \$999

**PC Connection
Exclusive Offer! \$999***



HITACHI

hp HEWLETT
PACKARD

SONY

COMPAQ

IBM

SHARP

TOSHIBA

FUJITSU

Add & Customize
with Brand Name Components

All monitors shown sold separately

COMPAQ



COMPAQ



IBM

hp HEWLETT
PACKARD

Deskpro EP 6300X 102353

- Intel® Celeron™ 300A
- 128K cache/4MB SGRAM
- 32MB SDRAM; 256 max. • 4.3GB HD
- 6 Slots/5 Bays
- Windows 95

\$899

NEW!
CELERON

- 54355 COMPAQ V55 15" Monitor (13.7" viewable) \$340
- 101852 COMPAQ 5700 17" Monitor (15.7" viewable) 129
- 57007 MDS 32MB RAM Upg. 79.95
- 57096 MDS 64MB RAM Upg. 199.95
- 57099 MDS 128MB RAM Upg. 299.95

Presario 5050 101437

- Intel® 333MHz Celeron™
- 128K cache
- 96MB SDRAM; 256 max. • 8.0GB HD
- 32X max. CD-ROM
- 56Kbps modem • Windows 98

\$999

UP TO \$100
REBATE!

- 55861 COMPAQ MV500 15" Monitor (13.7" viewable) \$249
- 55862 COMPAQ MV700 17" Monitor (15.9" viewable) 299
- 48066 MDS 32MB RAM Upg. 49.95
- 48067 MDS 64MB RAM Upg. 119.95
- 48012 MDS 128MB RAM Upg. 249.95

IBM PC 300PL 101987

- Intel® 350MHz Pentium® II
- 512K L2 cache
- 32MB RAM; 384 max. • 6.4GB HD
- 4 Slots/4 Bays
- Windows 98

\$1425

BUSINESS LEASE
\$51.46/mo.
\$0 down payment

- 100176 IBM Flatbed Scanner \$149.95*
- 100184 IBM 16.8GB IDE Hard Drive 449
- 56315 IBM 32MB RAM Upg. 89.95
- 56047 IBM 64MB RAM Upg. 179.95
- 56049 IBM 128MB RAM Upg. 319.95
- 102262 IBM 654 15" Monitor (13.7" viewable) 299.95

HP Vectra VL8 100999

- Intel® 350MHz Pentium® II
- 512K cache/4MB SGRAM
- 32MB RAM; 768 max. • 4.3GB HD
- 5 Slots/1 Bay
- Windows 95/WinNT

\$1429

BUSINESS LEASE
\$51.61/mo.
\$0 down payment

- 102857 HP 50 15" Display \$239
- 103158 HP 70 17" Display 394
- 58539 HP M9000 19" Display 840
- 58097 MDS 16MB RAM Upg. 89.95
- 49357 MDS 32MB RAM Upg. 79.95
- 49356 MDS 64MB RAM Upg. 229.95

TOSHIBA



FUJITSU



COMPAQ



IBM



Satellite 4000CDS 101103

- Intel® 233MHz Pentium® II
- 12.1" LCD Display
- 32MB RAM; 160 max. • 4.1GB HD
- 6.7 lbs. • 2.1" thin
- 24X max. CD-ROM • 56K faxmodem

\$1599

BUSINESS LEASE
\$57.74/mo.
\$0 Down Payment

- 103209 Lithium-Ion Battery \$229
- 24724 Battery Charger 229
- 101731 Kingston 32MB RAM Upg. 99.95
- 102513 Kingston 64MB RAM Upg. 199.95
- 102498 MDS 32MB RAM Upg. 99.95
- 102499 MDS 64MB RAM Upg. 189.95
- 102500 MDS 128MB RAM Upg. 799.95

LifeBook E330 104292

- Intel® 233MHz Pentium® II
- 12.1" Active Display
- 32MB RAM; 160 max. • 3.2GB HD
- 24X max. CD-ROM • 56K faxmodem
- FREE 32MB Upgrade!

\$1999

BUSINESS LEASE
\$72.19/mo.
\$0 Down Payment

- 60089 AC Adapter \$79
- 104015 Li-Ion Battery 259.95
- 104018 Port Replicator 169.95
- 104012 LAN Dock 479
- 57437 16MB SDRAM 49.95
- 49186 32MB SDRAM 99.95
- 49187 64MB SDRAM 169.95

Armada 1700 58895

- Intel® 233MHz Pentium® II
- 12.1" Active Matrix Display
- 32MB RAM; 160 max. • 4.0GB HD
- 56Kbps Modem/Integrated AC adapter
- 24X max. CD-ROM • Windows 95

\$2299

BUSINESS LEASE
\$83.02/mo.
\$0 Down Payment

- 59380 Lithium-Ion Battery \$199
- 59365 Convenience Base II 399
- 59366 Zip Drive 299
- 39973 MDS 16MB RAM Upg. 89.95
- 39974 MDS 32MB RAM Upg. 79.95
- 43262 MDS 64MB RAM Upg. 149.95

ThinkPad 600 54590

- Intel® 266MHz Pentium® II
- 13.3" Active Matrix Display
- 32MB RAM; 288 max. • 4.0GB HD
- 4.97 lbs. • 1.4" thin
- 24X max. CD-ROM • 56Kbps modem

\$3299

BUSINESS LEASE
\$139.14/mo.
\$0 Down Payment

- 55839 Selecta Base 600 \$199.95
- 45161 Dock BI 600 & 700's 899.95
- 46027 6.4GB IDE ThinkPad HD 1249.95
- 46533 Stealth Black Steak Mouse 24.95
- 48007 56K AC Adapter (380/560/600) 74.95
- 47509 IBM 20X CD Portable Storage 409.95
- 47507 IBM 20X CD Portable 3399



OUR POLICY • Your brands. Your way. Next day applies to in-stock items only. Systems ordered by midnight ET can be custom-configured for next day delivery. We accept VISA, MASTERCARD, AMERICAN EXPRESS, and NOVUS cards. No surcharge. Orders are shipped via Airborne Express at \$5.95 per order up to 3 pounds; over 3 pounds: \$5.95 plus \$1.25 per pound (or fraction thereof). This does not apply to orders shipped outside the Continental U.S. or to APO and FPO addresses. Shipping to Hawaii, Alaska, Canada, Puerto Rico, and the U.S. Virgin Islands may require additional time and charges. Call 800-800-5555 for shipping information. International orders add 2% surcharge and \$2.30 insurance. A contact phone or fax number is required. You will be responsible for actual shipping charges as well as tax and duty. Call 603-446-5555 or fax 603-446-7791 for information. Items of excessive size and/or weight may require additional delivery time. Checks must be drawn on a U.S. bank in U.S. dollars. Upon receipt and approval, personal and company checks clear the day they are received for immediate shipment.

OUR RETURN POLICY • Some products carry a money-back guarantee (MBG) allowing you to return your purchase for a full refund, excluding shipping charges, if you're not completely satisfied. Be sure to ask your Sales Consultant if the products you're ordering carry the MBG. • All products are covered by their respective manufacturers' warranties. Within thirty (30) days of purchase, we will replace or repair at our sole discretion any product that is deemed defective. After 30 days, the manufacturer's warranty process must be followed. • All non-defective returns authorized by PC Connection are subject to a 15% restocking fee, and must be completed within 30 days of invoice. • PLEASE NOTE: Due to restrictions placed upon us by the manufacturers, computers and printers are returnable in the first 30 days for repair only. Computers, printers, LCD projectors, and Quark products are not returnable for credit or exchange. • All returns require prior authorization and must be returned with all original packaging, accessories and documentation, including registration card, so please don't discard these materials. To request a return authorization (RMA), please call 1-800-800-0011. RMAs are valid for 10 days. Incomplete or unauthorized returns will be refused. YEAR 2000 DISCLAIMER • PC Connection Inc. encourages its suppliers to make their products and services year 2000 compliant. However, PC Connection Inc. does not represent or warrant that any product advertised or sold by it will not experience date-related errors resulting from the turn of the century (the year 2000). Any information provided on products have been furnished by the manufacturer. PC Connection Inc. Milford, NH. PC Connection and the racoon characters are registered trademarks of PC Connection Inc. All other trademarks remain the property of their respective companies. We are not responsible for typographical errors. Prices and promotions are subject to change without notice.

Choose 038 at www.pcmag.com/infolink

DATA STORAGE

Quantum

- 58560 2.5GB Fireball EX IDE HD \$139
- 50869 4.3GB Fireball SE Ultra SCSI HD 209
- 49029 12GB Bigfoot TX 5.25" HD 200

Seagate

- 46199 3.2GB Medalist EX IDE HD 129
- 51476 4.4GB Medalist Ultra ATA HD 139
- 55983 4.1GB Overhead Ultra2 VCD HD 775
- 54431 9.1GB Barracuda 9.1P Ultra SCSI 625

Western Digital

- 42537 5.1GB Cavalier Ret. Pkg. HD 149.95*
- 45919 6.4GB Cavalier Ret. Pkg. HD 169.95*
- 55997 8.4GB Cavalier Ret. Pkg. HD 199.95*
- 101327 10.1GB Cavalier Ret. Pkg. HD 249.95*

MODEMS

3Com

- 53094 56K Ext. faxmodem \$149.95
- 52953 56K V.90 Int. Winmodem 49.95*
- 53093 56K V.90 Int. faxmodem 129.95
- 51477 56K Smartlink Everything External faxmodem 199.95
- 57032 56K V.90 Cellular 199.95

Best Data

- 56473 56K PCMCIA Card faxmodem \$69.95
- 103651 56K Int. fax 120 max. baud 29.95

41048 New Laplink

- 55424 Xircom RealPort Integrated 56K+10/100 PC Card \$19.95
- 53669 Zoom 56K Dualmode fax Int. 99.95
- 57763 Hayes 56K Aurora V.90 PC Card 99.95
- 59194 TDK White Box 56K PC Card 79.95

MONITORS

Daewoo Electronics

- 101646 15" Flat \$119
- 103044 17" Flat 219

NEC

- 43812 15" MultiSync 4500 \$229
- 43816 15" MultiSync 4500 269
- 43813 17" MultiSync 4500 429
- 43817 17" MultiSync 4500 539

Sony

- 48123 15" Trinitron Multiscan \$259
- 48752 15" Trinitron Multiscan 299
- 48755 17" Trinitron Multiscan 449

Viewsonic

- 46460 15" SuperTron Q51 \$179
- 39386 15" Outquest Q53 189
- 39387 17" Outquest Q71 259
- 100217 17" Outquest Q71 359
- 48644 17" Flat 379
- 49867 17" Flat 379
- 48648 17" Flat 379
- 31254 21" Flat 999

PRINTERS

Canon

- 55854 1000Bt Bt. R. Portable \$349
- 43980 Bt. 200 Bubble Jet 99*
- 44669 Bt. 200 Bubble Jet 99*
- 55853 Bt. 1400 Bubble Jet 179
- 44670 Bt. 1400 Bubble Jet 299

Epson

- 100452 Stylus Color 74 \$279
- 55141 Stylus Color 74 249
- 55045 Stylus Color 74 349

Hewlett-Packard

- 101194 LaserJet 6300 \$179
- 44248 LaserJet 6300 299
- 40621 LaserJet 6300 399
- 55464 LaserJet 6300 699
- 53625 LaserJet 6300 799
- 47066 LaserJet 6300 1449
- 47064 LaserJet 6300 1149

Lexmark

- 58746 LaserJet 6300 \$749
- 56071 LaserJet 6300 1399

HANDHELD PCs

3Com

- 39153 PalmPilot Pro II 1MB \$229.95
- 54104 PalmPilot Pro II 1MB 349.95

Cross

- 52245 PalmPilot Pro II 1MB \$349.95

102534 Hewlett-Packard

- 49958 6200B Palmtop PC \$699
- 59973 6200B Palmtop PC 899

Sharp

- 48466 Palmtop PC 4500 \$649.95
- 58197 Palmtop PC 4500 16MB 899.95
- 55000 Palmtop PC 4500 16MB 479.95
- 48469 Digital Camera Card 379

YOUR brands.
YOUR way.
NEXT day.

PC Connection 24 hours
7 days
www.pconnection.com
800-800-1DAY

1 3 2 9

Nothing Lasts Longer

The world's
best-selling UPSs
now start at \$99

Renewable
UPS System
**DESIGNED
TO LAST A
LIFETIME!**

Site Wiring Fault Indicator
automatically identifies building
wiring problems

BlockSafe™ outlets give you room to plug in
transformer blocks

With over 45% of all data loss and
downtime caused by bad power, your
investment in an APC uninterruptible
power supply (UPS), with surge protection
and battery back-up, pays for itself the
first time you use it.

New: More power and productivity guaranteed.
The runtime of your APC Back-UPS will meet
or exceed that of any same VA UPS for desk-
top applications, or your money back! There's
plenty of time to shut down safely.

Multipath protection for your whole system
APC Back-UPS provides clean, consistent power
to your CPU and monitor, plus power protection
for your external modem, laser printer, fax
machine, or zip drives. Telephone/network surge
suppression keep you safe when you're online.

APC: Long lasting, cost effective

APC QuickSwap™ battery packs are the quick-
est, easiest way to safely renew your APC
Back-UPS. "Disposable" UPSs without hot-
swappable batteries could mean the end of
your investment.

Available at:

COMPUSA



Insight
800-346-0771

**Office
DEPOT, Inc.**

COMPUTER SECURITY WAREHOUSE
1-800-256-8299

©1998 APC. All Trademarks are the property of their owners. BP3B8CF - US

(800)347-FAUX PowerFax

E-mail: apcinfo@apcc.com

132 Fairgrounds Road, West Kingston, RI 02892 USA

APC has won more awards for reliability
than all other UPS vendors combined.



Choose 162 at www.pcmag.com/infollnk

BEST UPS 1998 POWER USER CHOICE



PowerChute™ plus power
management software lets
you configure UPS re-
sponse to over twenty
events. During an extend-
ed outage, WorkSafe™ can automatically save
data, close programs, and shut down your
computer, whether you're there or not.

Automatic Voltage Regulation (AVR) with
DoubleBoost™ and CellGuard™ intelligent bat-
tery management let you work through the
deepest prolonged brownouts without wasting
battery power, extend battery life, and speed
recharging.

APC Safety Readiness and Reliability
Microprocessor-controlled automatic battery
self-test regularly checks status of the unit
and ensures battery readiness

QuickSwap™ user-replaceable battery
system lets you easily renew the UPS system
and avoid factory service delays

Push-button circuit breaker provides user-
resettable overload protection and eliminates
the need to replace a traditional fuse or even
the entire "disposable" UPS

Internet and network ready



Editors' Pick: "We wouldn't
be caught dead without an
uninterruptible power supply -
and neither should you."

FREE! Catalog and UPS Selection Guide

Just mail or fax this completed coupon
for your FREE catalog and UPS selection
Guide. Better yet, order them today at:

<http://promo.apcc.com>

KEY CODE H960Z

- ☐ **YES!** I'd like more information. Please send my
FREE catalog and UPS selection Guide.
☐ **NO,** I'm not interested at this time, but please
add me to your quarterly newsletter mailing list.

Name: _____

Title: _____ Company: _____

Address: _____

City/Town: _____

State: _____ Zip: _____ Country: _____

Phone: _____

Brand of UPS used? _____ # _____

Brand of PCs used? _____ # _____

Brand of Servers used? _____ # _____



(888) 288-APCC x8303 • FAX: (401) 788-2787

Visit APC at Comdex Fall in
Las Vegas Booth #2654

Untrained Executives, Part II

Nobody ever said that *PC Magazine* readers lacked for good ideas. I asked for your input on the executive-training conundrum, and more than a hundred of you responded with suggestions. My column "The Untrained Executive" (October 6, 1998) was inspired by a road warrior I saw on a recent flight who

was having huge problems with his computer. I'll tell you more about him later, but first let's deal with those unruly executives and their resistance to normal training and orientation.

The responses were quite varied, from resigned acceptance of the problem to bold attacks on executive ignorance. Some complimented me for raising an issue that's often hidden by corporate shame; a few chastised me for not helping the guy while I was on the plane. I've gathered the responses and published them on my Web site. You can read them at www.billsbest.com/pexecutives.html.

Most readers agreed that executives cannot be put into classes with anyone else, and sometimes not even with each other. "Use the executive's ego against him," writes Jerry McKelvey. "Point out to the insecure executive that he is going to an 'executive-level' training course, that what he learns is going to be of special benefit to him in his job, and that this particular training course is only for those folks in certain jobs. Then teach him what he needs to know."

Claudia Drenan says, "The most success I've had was when an instructor came to the executive's office, gave a short demo, then assisted him one-on-one directly on his machine. I find the executive is more willing if he's not in class with his subordinates and if he doesn't have to spend time to get to the class."

How about a financial incentive? Some readers suggested tying a portion of bonus compensation to PC proficiency. Should the board of directors demand PC proficiency from its executives? Interesting question, and one that probably won't be an issue in ten years. The up-and-coming generation is far more likely to have grown up with computers, and familiarity, if not proficiency, can be taken for granted.

Along those lines, some readers suggested that we simply wait for the take-a-letter guys to die off. And of course, I got the requisite letters from engineers who said that they were the only ones who really knew what was going on; the executives

should step aside gracefully, therefore, and give their jobs and big salaries to the techies. Others suggested draconian solutions such as software that would force execs through a tutorial before they could use it. Right—I got a laugh out of that one, too.

In a more serious vein, another group laid the blame squarely on Microsoft and other vendors. "Perhaps the way to get executives to go to training on how to use their PCs is to start with PCs that work," wrote Roger Jones. "[Executives] are used to helpers to whom they can give a task and not have to worry about it until it's done right. Why would they trade this for a computer that can't seem to get much right?"

Gary Ralph suggested the security angle: "Execs risk loading their laptops with all sorts of proprietary information and confidential memos. Laptops are stolen by the zillions, and each one can contain enough to sink a company. Convince the boss that his or her products (along with the office gossip) might fall into the hands of the opposition, and you may inspire the boss to order training for his leadership team."

Some readers implored me to take pity on the sole proprietor and the small-business owner who has to support himself and a couple of employees, all while running and growing a business.

Regarding the fellow on the plane, it turns out that he is a reader of *PC Magazine* and recognized himself in the column. He's one of those beleaguered heads of a small company, and what I mistook for complacency was really remarkable fortitude in the face of a badly misbehaving laptop. We've exchanged e-mail, and I believe his problem is due to a conflict between Windows 98 and his machine's power management software. It's a common complaint, but if the guy who sold you the machine disavows all knowledge, where do you turn when you're the CEO, COO, CFO, and CTO, not to mention head of sales, marketing, and office services? I've apologized to him for not having helped him on the plane. **PC**



Some of you complimented me for raising an issue that's often hidden by corporate shame.

More on the Web:
Join us online and make your voice heard. Talk back to Bill Machrone in our *Opinions* section.
www.pcmag.com/opinions

Introducing our new LCD, with USB.



\$899 14.1"

\$1129 15"

Designed, engineered, manufactured, distributed and serviced by iiyama. From start to finish, control and consistency equals quality.

Now iiyama offers you a 15" LCD that's loaded with features. It comes equipped with a USB, multimedia speakers and head-

phone jack. For real space savings, we also offer a 14.1" LCD with an optional USB. Both of these active matrix monitors have sturdy bases that anchor firmly to your workstation or desk.

	TFT/LCD Monitor Model	TCO	Pixel Pitch	Max. Horizontal Scan Rate	Max. Resolution	Est. Street Price
14.1"	Pro Lite 36a (with OSD)	TCO '95	0.279mm	62.5khz	1024 x 768@75hz	\$899
	Pro Lite 36b (80° Viewing Angle)	TCO '95	0.279mm	62.5khz	1024 x 768@75hz	\$1,129
15"	Pro Lite 38a (with OSD)	TCO '95	0.279mm	62.5khz	1024 x 768@75hz	\$1,129
	Pro Lite 38b (with OSD, USB & Speaker)	TCO '95	0.279mm	62.5khz	1024 x 768@75hz	\$1,179



iiyama

For the name of your local dealer call: (800) 394-4335 • www.iiyama.com

* Actual price as of 10/01/98. Please call (800) 394-4335 or visit www.iiyama.com for current pricing.

© 1998 iiyama North America, Inc. All rights reserved. iiyama, the iiyama logo, No Worries, and the RSVF logo are trademarks of iiyama North America, Inc. All other trademarks are the properties of their respective owners.

**Three year parts and labor, 1 year backlight. Estimated Street Price is shown; actual price may vary. Prices do not include shipping, handling and any applicable taxes. Specifications are subject to change without notice.

As an Energy Star™ Partner iiyama has determined that this product meets the Energy Star™ Guidelines for energy efficiency. For more information, please write us at 575 Anton Blvd., Suite 590, Costa Mesa, CA 92626. 800/394-4335 714/437-5111, Fax: 714/437-5982



ISO 9001



January 6, 1998
VisionMaster Pro 17



Perfect Five-Star Rating
January 1998
VisionMaster 450
VisionMaster Pro 500

ComputerLife

Perfect Five-Star Rating
November 1997
VisionMaster Pro 17



Performance & Technical Excellence
March 1997
VisionMaster Pro 21



Six Time Winner
Jan 1997, Feb 1997, March 1997,
April 1997, May 1997, June 1997
VisionMaster Pro 21



October 7, 1997
VisionMaster Pro 17



March 1997
VisionMaster Pro 21



Twelve Time Winner
July 1996, Jan 1997, March 1997, July 1997,
Sept 1997, Jan 1998, March 1998,
May 1998, July 1998, Sept 1998
VisionMaster Pro 17
April 1998, August 1998
VisionMaster 450

Choose 184 at www.pcmag.com/infolink

The Next Really Bad Idea

If you're looking for the next big flop in the world of computerdom, look no further than the emerging e-book—a hand-held device designed to download entire books to be read on the device. I'm reminded of the defunct Dynabook reader, which played CD-ROMs and had a similar portable-book

concept about a decade ago.

These new ideas are out of sync with the realities of the marketplace, because they always emerge out of those specialty conferences where "group-think" is an epidemic. These are the conferences where new venture capitalists and hordes of know-nothings spend \$1,500 or more to be told what's new and exciting.

Since so few people realize that the demos they see wouldn't even qualify as proof-of-concept in most venues, they get all gaga over what they're shown, and the buzz begins. "E-book readers are going to be hot next year! Man, did I get my money's worth out of that conference." The buzz surrounding these devices is so rampant that a conference was convened by the National Institute of Standards and Technology, and a consortium of publishers is forming to begin a standards war.

The companies announcing their intention to enter this market now include Everybook, Librius, NuvoMedia, and SoftBook. The readers are typically the size of a small clipboard or notepad, weigh anywhere from 1 to 3 pounds, and have covers that resemble regular book covers (leather seems to be the au courant material). Inside the e-books are built-in modems and varying amounts of memory (flash or powered DRAM). Expect a capacity of 1,000 to 2,000 pages of text in early models. The devices also have processors and PCMCIA slots. Many of them use proprietary OSs, but I expect Microsoft will roll out a book-reader version of CE.

The screens are high-contrast monochrome or color, and the software and format will vary from machine to machine. The prices should range from \$200 to \$500 for the reader/binder/whatever you call it, and you can subscribe to the equivalent of the E-Book of the Month Club for about \$19 per download. The big publishers are hot on this idea and think it'll be ripe for best-sellers. So what's wrong with this picture? Here are a few thoughts:

- **Ignoring trends.** People buy books as much to put them on the shelf as to read them. There is also a so-

ciological aspect reading. Some people enjoy lugging a huge Stephen King book around to show off the fact that they can endure 200,000-word novels about crazed otherworldly maniacs and spooks. Conversations start when you're carrying around an interesting-looking book.

- **Barrier to entry.** Much book buying is done at the spur of the moment. People aren't going to go through a huge rigmarole to download a book. The market for downloadable books has been tested for years by Project Gutenberg, as well as various universities trying to put all text in machine code. You can download a free book today and read it tomorrow, but only a few people (mostly researchers and academics) bother to do so.

- **Reduced convenience.** Besides having to download the text, these readers are more difficult to share than a real book. And what about marking up the text or dog-earing a page? We have too much history with real books to take this seriously. This is a completely new format for something that has been tweaked to perfection over the centuries.

- **Technology.** I have yet to see a display screen that doesn't sacrifice contrast and readability in dim light or bright sunlight. The display needs to be at least 300 dots per inch with a contrast ratio of 40:1 to 50:1, and it must be readable in both the brightest sunlight and the most poorly lit office. Good luck.

- **Copycat thinking.** Everyone involved in this business insists that the e-book should look and feel like a book—hence the two-page displays, book size, and book cover. Many readers won't allow scrolling, only turning pages. What a laugh; just read a book.

- **Prices of source material.** Since 75 percent of the cost of a book today is chewed up in distribution, ink, and paper, you'd think they would reduce the cost of an e-book by 60 percent or more; at \$20 a pop, it's a joke. A better idea would be to bring out new e-book titles during the paperback cycle for something like \$2 a book. This might actually trigger interest.

After the initial burst of interest, this whole idea is going to fall flat.



So few people realize that the demos they see wouldn't even qualify as proof-of-concept in most venues.

More on the Web:

Read John C. Dvorak's news, views, and snide asides every Monday, exclusively at PC Magazine Online.

www.pcmag.com/dvorak

ViewSonic's family just got bigger.

From ultra light to ultra bright.



PJL802



PJ820



PJ1000

From our perfectly portable ViewBook™ to our breathtakingly brilliant Office Theater projectors, you get everything you need.

If presentations are important to you, the most important name you need to know is ViewSonic.® Our family of 3-panel active matrix LCD projectors is growing by leaps and lumens. All you have to do is plug them in and turn them on. No diagrams, no adapters, no sweat.

Our new PJL802 ViewBook projector is an ultra light, 11.0 pound portable that barely tips the scales at all. Yet its maximum brightness and supported resolutions combine to deliver heavyweight-class performance. When you factor in its built-in PC card slot, the new PJL802 becomes the perfect portable for presentations on the go.

When it comes to ultra bright projectors, nothing can match the ANSI lumen brilliance of our two Office Theater projectors, the new PJ820 and the new PJ1000. They're simply brilliant. We are rightfully proud of their dazzling performance. And their portability.

Available wherever you buy ViewSonic monitors.

With ViewSonic's growing family of projectors, you really do get it all. And then some. You get the kind of leading-edge technology and performance you've come to expect from ViewSonic displays. Plus you get the convenience and accessibility of buying the ViewSonic projector you need where you currently buy your computer peripherals.

Come see the new PJ820, PJ1000 and PJL802 LCD projectors for yourself. Then you'll understand why, in our family, you can never be too bright or too light.

For the dealer nearest you, call ViewSonic at (800) 888-8583 and ask for agent 81225, or visit our website at: www.viewsonic.com.

	ViewBook™	Office Theater™			
Model	PJL802	PJ800	PJ820	PJ1000	
Brightness*	400	550	750	600	
Display Size	20" – 300"	30" – 300"	30" – 300"	21" – 600"	
Optimal Resolution	SVGA 800 x 600	SVGA 800 x 600	SVGA 800 x 600	XGA 1,024 x 768	
Max. Supported Resolution	1,024 x 768	1,024 x 768	1,024 x 768	1,280 x 1,024	

*Brightness in ANSI lumens may vary up to 10% depending on room lighting and lamp conditions.
(909) 869-7976 Fax: (909) 869-7958 • Internet: www.viewsonic.com
Specifications subject to change without notice
Copyright © 1998 ViewSonic Corporation • All rights reserved



ViewSonic PJ1000
May 1998



ViewSonic®
See The Difference!

John C. Dvorak's



INSIDE TRACK

Junket Report. When Craig Barrett went to London recently, he managed to **reveal** a number of interesting opinions and observations that were **not picked up** by the American media. He believes, for example, that the PCI-X bus **consortium is a conspiracy** by Compaq and others to untrack Dell, which was purposefully left out of the group. Apparently Dell executives **felt the same way** but were reluctant to complain. The company is interested in the project but was cut out of the loop. Dell has always been perceived by its competitors as being in **Intel's pocket**. Barrett also said that the **NC was dead**, no matter what anyone believed, and specifically, **only Larry Ellison** still believed in the concept.

Other factoids revealed throughout his visit to England included the figure that Intel's sales via the Web from July to October were **over \$2 billion**. He said this would become \$20 billion in 1999. In one meeting, he said price slashing will continue, and elsewhere he said he **wasn't concerned** about Compaq's using the Alpha chip rather than the Merced for its Tandem machines. These Brits followed him everywhere.

In a meeting with London business executives, he rolled out **more new code names for future processors**, including Fosters for the IA-32 processor, to come after Cascades. Then code names will start to change from Pacific Northwest references to offbeat references (possibly Hawaiian) such as **Lilac and Koa**. What these are is unknown.

While Barrett flits around Europe, the **DRAM business is getting weirder** by the minute. After being lectured about the inevitability of Rambus's being the memory technology of the future, I'm amazed at how much resistance the RAM makers are exhibiting. **The latest** is something called **double-data-rate DRAMs**. The first example is a 64-Mb part promoted by Fujitsu, Hitachi, and Mitsubishi. Using some new concepts to read data contained in memory, a DDR DRAM can supposedly hit **1.6 gigabits per second** of data from DRAM. This is on a par with Direct Rambus.

Besides competing with Rambus and the seemingly moribund SDRAM, DDR DRAM also competes with the recently announced **NEC Virtual Channel Memory** technology. As far as I can tell, this situation is going to be a mess, because all these technologies are incompatible with one another, and motherboards have to be designed around each one differently.

Support chip set makers are in the middle. Some Taiwanese companies have **backed NEC** and say they'll make the support circuits for the motherboards. Intel is going with Rambus, and it controls most of the motherboard manufacturing. The DDR DRAM chips will be hitting the market as this column hits the

newsstands. I think it's going to mean that PC Magazine Labs will begin to see machines with **seriously different performance characteristics**. That in itself should make things interesting.

Look Out for These Guys Dept.: There's been a buzz in the valley and elsewhere about **Transmeta**, a start-up that's going to join in the chip fray. It seems that with the help of some old Cyrix honchos, the company is going to make yet another x86 clone. But this one is going to be **ultra-low-power** and designed for modern notebooks. Transmeta sees a huge gap in the market not being addressed by AMD or Intel. Now you know.

Home Networking Dept.: I sit here on my home network, which plugs along at 100 Mbps over cheap Ethernet cabling, and shake my head every time **yet another crummy new scheme** for low-speed home networking looms. Over the years, the promises of home RF networks come and go. They **mostly go**, because nobody can figure out how to make a cheap system. One megabit seems to be the common denominator.

A company called Sharewave is pushing a 4-megabit system using the 2.4-GHz ISM band. The kicker is, the company claims it can squeeze a 120-Mbps video stream into this little pipe using some sort of proprietary compression scheme, giving the home network full-motion video capability. The company is banking on a demand for this. Go figure. I suppose this could come in handy for security and other purposes. As far as I'm concerned, this isn't the answer, and 4 Mbps is **too slow** from the get-go. **Earth to networking companies!** As my 100-Mbps Ethernet cranks along, I'm seriously looking into gigabit Ethernet as an alternative. I can't be alone in this.

Making-It-Up-as-You-Go-Along Dept.: Just as I was hearing how TVs as Internet-access devices like WebTV) were failing miserably, a new report from Inteco comes out that claims otherwise. In fact, it says that **the desktop PC is toast** and TVs will rule. Yeah, right. **Don't be fooled by bad logic.** The study indicated that eight out of ten new computer buyers say that Internet access is a main reason for buying a computer.

Supposedly, in the next five years most set-top boxes will allow for limited Internet access. Thus the analyst concludes that people will lose a primary rationale for buying a computer. The computer business will be **in the dumper**. We're beginning to see more research with valid numbers and dubious interpretations, usually **twisted** to fit the market for the research itself. During these slow periods, the marketing people want more and more data in order to **rationalize bad corporate decision making**. Don't be fooled. Good numbers and bad analysis are more and more common. My advice: **Do your own thinking.** PC

*Earth to networking
companies! As
my 100-Mbps
Ethernet cranks
along, I'm seriously
looking into gigabit
Ethernet as an
alternative. I can't
be alone in this.*

**A POWERFUL
NOTEBOOK
SHOULDN'T
COST YOU AN
ARM AND A LEG.
OR A SHOULDER
AND A BACK.**



**NEW DELL[®] INSPIRON[™] 3500 D233XT
PENTIUM[®] II PROCESSOR AT 233MHz**

Lightweight, Light Price Notebook

- 13.3" XGA Active Matrix Display
- 32MB SDRAM (256MB Max)
- 3.2GB Ultra ATA Hard Drive
- Modular 24X Max[™] Variable CD-ROM
- Modular 3.5" Floppy Drive
- NeoMagic MediaMagic 256AV AGP Video
- 3D Surround Sound and Software Wavetable
- Intelligent Lithium Ion Battery
- Microsoft[®] Home Essentials 98 with Money 98
- Microsoft Windows[®] 98
- Touchpad

• 3-Year Limited Warranty[†]

★ Upgrade to 48MB SDRAM, add \$49.

★ Upgrade to a 4GB Ultra ATA Hard Drive, add \$99.

★ 56K Capable[®] x2 Modem, add \$99.

★ 3Com[®] 10/100 Fast Ethernet Adapter, add \$129.

Featured System

\$1999

Business Lease[®]: \$76/Mo., 36 Mos.
Order Code #891113

**NEW DELL INSPIRON 3500 D266GT
PENTIUM II PROCESSOR AT 266MHz**

Lightweight, Light Price Notebook

- 14.1" XGA Active Matrix Display
- 64MB SDRAM (256MB Max)
- 4GB Ultra ATA Hard Drive
- Modular 24X Max[™] Variable CD-ROM
- Modular 3.5" Floppy Drive
- NeoMagic MediaMagic 256AV AGP Video
- 3D Surround Sound and Software Wavetable
- Intelligent Lithium Ion Battery
- Internal 56K Capable[®] V.90 Fax Modem
- Microsoft Office 97 Small Business Edition v2.0
- Microsoft Windows 98
- Touchpad

• 3-Year Limited Warranty[†]

★ Upgrade to a 6.4GB Ultra ATA Hard Drive, add \$199.

★ Second Lithium Ion Battery, add \$129.

Featured System

\$2649

Business Lease[®]: \$100/Mo., 36 Mos.
Order Code #891105



Okay. So we're not doctors. But we are engineers. And if your high-performance notebook weighs you down, then it seems pretty logical you should get your hands on our latest portable, the lightweight Dell[®] Inspiron[™] 3500. Weighing just 6.1 pounds^a and measuring only 1.55 inches thick, you'll find the 13.3" display and Pentium[®] II processor (up to 300MHz) downright liberating. And starting at \$1999, its price promises a lot of relief, too. Call, or visit our website.

**DELL INSPIRON 7000 D300LT^{††}
PENTIUM II PROCESSOR AT 300MHz**

All-in-One Multimedia Performance

- 15" XGA Active Matrix Display
- 64MB SDRAM (384MB Max[®])
- 4GB Ultra ATA Hard Drive
- Removable Combo 24X Max[™] Variable CD-ROM and 3.5" Floppy Drive
- 2X AGP 4MB ATI Rage Pro 3D Video
- 3D Surround Sound and Hardware Wavetable
- Intelligent Lithium Ion Battery
- Internal 56K Capable[®] V.90 Fax Modem
- Microsoft Office 97 Small Business Edition v2.0
- Microsoft Windows 98
- Touchpad

• 3-Year Limited Warranty[†]

★ Upgrade to 96MB SDRAM, add \$99.

★ Upgrade to a Removable Combo 2X DVD-ROM Drive and 3.5" Floppy Drive, add \$199.

★ Custom Leather Case, add \$99.

★ 3Com 10/100 Fast Ethernet Adapter, add \$129.

\$2999

Business Lease[®]: \$114/Mo., 36 Mos.
Order Code #891103

**DELL INSPIRON 7000 D300LT^{††}
PENTIUM II PROCESSOR AT 300MHz**

All-in-One Multimedia Performance

- 15" XGA Active Matrix Display
- 128MB SDRAM (384MB Max[®])
- NEW 8GB Ultra ATA Hard Drive
- Removable Combo 2X DVD-ROM Drive and 3.5" Floppy Drive
- 2X AGP 8MB ATI Rage Pro 3D Video
- 3D Surround Sound and Hardware Wavetable
- Intelligent Lithium Ion Battery
- Custom Leather Case
- Internal 56K Capable[®] V.90 Fax Modem
- Microsoft Office 97 Small Business Edition v2.0
- Microsoft Windows 98
- Touchpad

• 3-Year Limited Warranty[†]

★ Second Intelligent Lithium Ion Battery, add \$129.

★ 3Com 10/100 Fast Ethernet Adapter, add \$129.

★ Inspiron 7000 Port Replicator, add \$149.

\$3949

Business Lease[®]: \$150/Mo., 36 Mos.
Order Code #891131

TO ORDER BY PHONE

Keycode #04923

800-590-7455

M-F 7a-9p • Sa 10a-6p • Su 12p-5p CT

In Canada^{*} call 800-233-0702

In Mexico^{*} call 001-800-210-7607

GSA Contract #GS-35F-4076D

BUILD YOUR OWN AND ORDER ONLINE

BE DIRECT[™]

DELL[®]

www.dell.com/buydirect



These are just a few of the thousands of configurations available. For faster service, please have your order code and keycode available when calling.

Pricing not discountable. *Prices and specifications valid in U.S. only and subject to change without notice. [†]For a complete copy of Guarantees or Limited Warranties, write Dell USA L.P., Attn: Warranties, One Dell Way, Round Rock, TX 78682. [®]Business leasing arranged by Dell Financial Services L.P., an independent entity, to qualified customers. Above lease payments based on 36-month lease, and do not include taxes, fees, shipping charges, subject to credit approval and availability. Above lease terms subject to change without notice. [™]24X Max/10X Min [®]Download speeds limited to 53Kbps. Upload speeds are less (in the 30Kbps range) and vary by modem manufacturer. Speeds also vary depending on line conditions. Analog phone line and compatible server equipment required. ^{††}Maximum RAM configurations require a factory installed 128MB SDRAM, which must be installed at time of initial purchase. ^aWeight with floppy drive in options bay. [†]Starting at 8.3 pounds. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. Microsoft and Windows are registered trademarks of Microsoft Corporation. 3Com is a registered trademark of 3Com Corporation. ©1998 Dell Computer Corporation. All rights reserved.



Investments. College savings. Retirement.
Quicken Deluxe 99 helps you see what lies ahead.

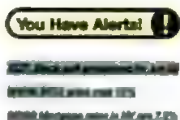


There are upgrades then there are, well, upgrades. With Quicken Deluxe 99, you can now see your financial situation in the context of the big picture. See how you're doing and, more importantly, see how you might be able to do even better. Quicken Deluxe 99 helps you seize control of your finances as you never could before.

Some of the great new features for Quicken Deluxe 99:



*Customize Your Entire Financial
 Picture on One Screen*



*Be Alerted to Specific
 Ways to Do Better*



*Look Before You Leap
 with What-If Scenarios*

See what your money can do.

**Quicken
 deluxe99**

www.quicken99.com

The Jimmy Awards

In a business already full of awards—from our prestigious *PC Magazine* Technical Excellence Awards to others that seem almost intentionally irrelevant—do we really need any more? Yes, sez I. For several years I've been musing about a new and different kind of annual award. And so with this column,

I hereby establish the Jimmys: the Jim Seymour "Just About Perfect" Awards.

Over the course of a year, we see literally thousands of new products. Many aren't so hot, some are good to very good, and a few are very, very good. We try to flag the very good ones with Editors' Choice tags and the technically superb ones with Technical Excellence Awards. But there's another category of products I see every year, which while incredibly small is important and valuable.

Even among the best of the products we see, we usually have long lists of things we'd like to see changed. A new product may be good, and it may even be great. But it's rarely without flaws, sometimes particularly irritating flaws.

Then along comes that rara avis, the just-about-perfect product—the one we're hard-pressed to imagine being improved. That's the product that deserves a Jimmy.

Two caveats. After all (to pervert the language for a moment), perfection is of course relative.

First, we'd like computer products, all of them, to be faster, lighter, smaller, and cheaper—the FLSC ("flisk") Factor. In that sense, no product could qualify as just about perfect. For the Jimmys, those flisk tests are applied relatively: At the present state of the art, is this product at or beyond reasonable expectations in this category?

Second, perfection is also relative in that it lies in the eye of the beholder. We can quantify, compare, calibrate, and otherwise bring the scientific method to Editors' Choice and Technical Excellence winners. But the Jimmys are intuitive as well. Sure, winners have to measure up quantitatively, but the essence of perfection lies in that last half-inch, the immense gulf between excellent and perfect. And that's always subjective. So remember that these products are perfect—in one man's opinion. Mine.

Finally, I'll underscore the fragility of perfection by telling you the one thing—the one, tiny, still-does-not-keep-it-from-being-just-about-perfect thing I'd change about each of these gems.

After all, these are the Just About Perfect Awards. The 1998 Jimmy winners are:

• **Dell Inspiron 7000.** With its brilliant 15-inch TFT display, 300-MHz Pentium II processor, 64MB of RAM, 8GB hard disk, killer-fast ATI Rage graphics, and second-generation DVD drive, as well as the best keyboard I've ever used on a notebook, the Inspiron 7000 has emerged as the best portable PC ever. It's a perfect desktop replacement, a great home PC, and the ultimate traveling presenter's machine. Unfortunately, it's also huge (weighing 9 pounds), so if you're going to carry it around much, you've got to want and need its power and pizzazz to put up with that size and weight. I do, so I do. *The one thing I'd change: Dell, put little foldout feet on your notebooks. We need tilted keyboards, not ironing boards.*

• **Sharp Actius A100.** The Mutt to Dell's Jeff, the tiny, sleek, elegant Actius is the best of the new wave of subnotebooks from Japan and a perfect choice for the frequent-to-constant traveler who wants the lightest, smallest, and best. The Sony VAIO 505G was the first horse out of the gate and got a lot of attention. But those who held off purchasing got a better choice: the Actius. With an incredibly bright 11.3-inch display, respectable performance from its 233-MHz Pentium MMX CPU, a 3.2GB hard disk, a 56K internal modem, 64MB of RAM, and a superb keyboard for such a small machine, the Actius gets the prize. Looking at another small notebook? Don't sign that credit card slip until you've seen the Actius. *The one thing I'd change: Foldout feet to tilt the keyboard—not as critical as on the Inspiron 7000 but still important.*

• **Kodak DC260 Digital Camera.** It ain't pretty, but the DC260 is the best of the current crop of megapixel digicams, by a mile. It absolutely cuddles into your hands, and the controls fall in just the right places. A 6X zoom (half real, half digital-cheater) lens works fine and retracts for compactness. Image quality is first-class, and as the first adopter of the innovative new DigiA operating system for digital imaging devices, the DC260 actually makes it easy for you to figure out and use the many cool features. *The one*



The half-dozen practically perfect products (should I call these the P3's?) I've seen so far this year.

More on the Web:
Join us online and make your voice heard. Talk back to Jim Seymour in our Opinions section.

www.pcmag.com/opinions

Now, it's fun and easy to build your own system!

3-Year Warranty

Turbo-Cool® 300 ATX
(50% more power than
Compaq or Dell)

Long-life Auxiliary
Cooling Fan

Intel 440 LX AGP Set

On-board Audio (optional)

Accepts 233-450 MHz
Pentium® II (not incl.)

3 DIMM Sockets
(8K, 384 MB max.)

2 ISA, 4 PCI, 1 AGP Slots
100 MHz Bus Speed

Flash BIOS support for
LS-120 and ZIP Drives

Built-in Diagnostics

Quick Set-Up Instructions
on inside panel

PC®

Model P2MT3008

Rigid, easy-access
Personal Mid-Tower Case
(7.3"W x 17.1"H x 18.6"D)

Auto-configure
(no jumpers to set)

6 Drive Bays (upgrade to 8 for \$5)

For just \$429, you'll have the foundation for a perfect PC.

PC POWER & COOLING, INC.

5995 Avenida Encinas, Carlsbad, CA 92008 • (760) 931-5700 • (800) 722-6535 • Fax (760) 931-6988 • www.pcpowercooling.com

Also available: 5339 model P2MT300 (LX, 66 MHz bus) Hours: 7 a.m.-6 p.m. (PT) Mon-Fri. Terms: Visa, MC, COD, or PO on approved credit. © 1998

Choose 080 at www.pcmag.com/infolink

Jim Seymour

thing I'd change: Deliver the camera with a 16MB Compact Flash card, not a cheesy 8MB card.

• **LapLink Professional.** If you still think of LapLink as just a way to transfer files from desktops to notebooks, you haven't been paying attention. The best file-transfer program has grown up into the best remote-control software as well; and with 1998's new Pro version (which finally gets rid of the confusing lineup of Win 3.1/Win 95 and Win 95/Win NT SKUs), it adds USB transfers for blindingly fast and easy, hot-pluggable transfers (if only between Win 98 machines, unfortunately). *The one thing I'd change: Put the USB cable in the box, Trav-Soft, instead of making it a pricey add-on, and lose that stupid serial-to-serial cable.*

• **Creative Labs PC-DVD Encore Dxr2 upgrade kit.** Until mid-1998, I warned friends and readers to stay away from DVD drives until the market stabilized. No more. Second-generation 2X DVD drives are well worth their relatively modest cost, and if you're looking for a DVD upgrade, you won't find one better than the Dxr2 kit. You get superb-quality movies, fast CD-ROM reads (about 20X), MPEG-2 video, Dolby Digital sound—everything you want in a DVD. Even a great price: The cost was just cut to about \$169, after a \$30 rebate. *The one thing I'd change: the installation instructions. The Dxr2 isn't hard to install, but you wouldn't know it from the docs.*

• **Codi AirPro notebook bags.** A carrying case in a list of award-winning products? You bet. If you carry a notebook PC, you know how important it is to keep that PC working. Yet few notebook cases are designed to accommodate and also protect everything we need—notebook PC, accessories, cell phone, working papers, and so on. Enter Codi's AirPro series, intelligently designed and beautifully made Cordura bags that have complex inflated liners for the computer partition, to protect your PC—and maybe your career. Sold direct by Codi, at www.codi-inc.com, they are the best. Period. *The one thing I'd change: I haven't found it yet.*

That's it: the half-dozen practically perfect products (should I call these the P3's?) I've seen so far this year. **PC**

Best of
the Best.

EDITORS'
CHOICES

See who we picked, and why.

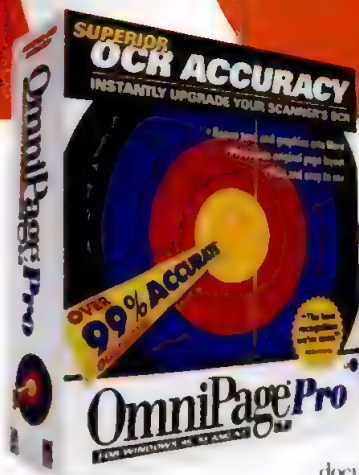
In every product category.

www.pcmag.com

PC
MAGAZINE
ONLINE

BOOKMARK
The Benchmark.

INTRODUCING THE FASTEST, MOST ACCURATE OCR EVER.



New OmniPage Pro 9.0: Over 99% accurate—guaranteed.

Others may talk a good game. But only OmniPage Pro is the most accurate, best-selling brand of OCR. Why? Guaranteed OCR accuracy—uncanny precision that recognizes poor-quality faxes and copies, small text and crooked pages. The ability to preserve document, table and even spreadsheet formats. And, the ability to scan text directly into Microsoft Word and other applications.

OmniPage Pro 9.0 is the world's most accurate OCR made even more accurate. If you're not using it, you're taking chances. Call us now to order, or visit your local reseller.

- Maintains original page layouts
- Seamless integration with Microsoft Word
- Easy, one-button AutoOCR Toolbar™
- Now preserves graphics in color
- Recognizes tables and spreadsheets
- Now includes PageKeeper Standard. Easily file and find scanned images!

ALL FOR ONLY \$99

800-736-5735, x. 10

Supports Windows 95, 98 and NT.

**"The best
recognition
we've seen."**

PC Computing



www.caere.com



*Using standard fonts on laser-quality documents. **Suggested price U.S. dollars—subject to change without notice. Offer valid in U.S. and Canada only. Caere, the Caere logo, OmniPage and PageKeeper are registered trademarks and AutoOCR Toolbar is a trademark of Caere Corporation. All other names are the property of their respective holders. © 1998

Choose 345 at www.pcmag.com/infolink



Buy a Monorail PC
instead of a Dell, Compaq
or HP and free up money
for other luxuries.

Like food.



MONORAIL PC 8325

Pentium® II Processor

at 350MHz,

4MB AGP Video,

64MB SDRAM

and a 15" monitor

starting below \$1200.*

Ok. Buying the latest and greatest Dell, HP or Compaq PC isn't really going to force anybody to live on cat food and crackers. But, get a Monorail PC instead, and you'll feel free to treat yourself and several friends at that hot new chichi restaurant with the \$25, gourmet enchiladas. You see, spec for spec, component for component, Monorail PCs go head to head with the best Dell, HP and Compaq build. At a price that's up to 30% lower. Our unique way of doing business eliminates the need for globe-spanning manufacturing facilities, armies of Executive Vice Presidents and acres of offices. We don't pay for that, so neither do you. Our warranties and service agreements are equal to the best anybody else offers, too. In fact, the same company that handles service for the leading PC makers handles service for us. So go ahead. Check out Dell, HP and Compaq. Visit our website. Visit a retailer. And buy a Monorail. After all, which would you rather do; pay for some Dell, HP or Compaq guys to go out for an extravagant dinner, or enjoy one yourself.

 **MONORAIL**
Computer Corporation



www.monorail.com

Choose 254 at www.pcmag.com/infolink

© 1996 Monorail Computer Corporation. Price comparisons are based on equivalently configured PC's from Dell, HP and Compaq. Intel, Intel Inside logo and Pentium are registered trademarks of Intel Corporation. *Estimated Street Price.

The Vision Thing

Know what's going to make the PC easier to use? Lousy vision among industry leaders. Seriously. A generation of vice presidents at Intel, Microsoft, and elsewhere who are now about 40 years old will see their vision head downhill over the next couple of years. The ones with 20/20 vision will need

reading glasses; the ones with glasses will need bifocals; the older ones with bifocals will need trifocals. And everyone's going to find it harder to read in dim light. This will get them interested in making their OSs, PCs, and hardware more accessible to those of us in the middle—without perfect vision or serious vision disabilities.

Visit the Microsoft campus in Redmond and you'll see posters exhorting Microsoft staff to think about the needs of people with severe handicaps. PCs are powerful tools that can improve the quality of life of people with serious disabilities. Right now, for instance, speech recognition is just about there. And speech synthesis works. (Although the graphical nature of Microsoft Windows and the Web is a drawback.)

But there's not much (if any) work being done to address the problems of people in the middle—and it's not just a few people. Some 147 million Americans (about 55 percent of the population) wear corrective lenses, according to the American Optometric Association, and the number is growing. Most people need at least reading glasses by the time they reach their mid-forties, and the population is aging. The median age of the U.S. population has jumped from 29 just before World War II to 35 today.

What kinds of hassles are we talking about? They are mostly low-level ones but still annoying. I recall a 40-something presenter onstage at an industry forum, trying unsuccessfully in dim light to plug his modem dongle (the proprietary connector cable) into his PC Card modem.

What would help out the silent majority of 150 million? Bigger monitors are the first solution. At the very least, get (or demand) a 17-inch monitor, and think about the 19-inch models that now cost well under \$1,000. Bigger monitors help in two ways: First, everything is bigger at the same resolution. And when you push a bigger monitor farther back on your desk, it may be easier for older eyes to focus on.

Don't put your monitor on top of your PC if you

wear bifocals. You'll arch your neck so far back it may cause undue strain. Place the monitor so neither it nor you is facing a window. If you use a PC all day long, consider a separate pair of glasses corrected for however far away you keep your monitor.

Windows itself has a number of tools. Click on Control Panel, then Accessibility Options. The high-contrast and larger-screen font display settings will be a help for many people. The settings apply only to some parts of Windows and Windows applications, however. And frankly, they can be pretty clunky. In programs that offer a zoom feature, work at 150 to 200 percent of normal size. Tinker with Windows' accessibility options to see if any of them are your cup of tea.

Look for the handful of printers, scanners, and other accessories whose controls are marked with labels of contrasting colors. If the devices don't have them, make your own. Check out the Brother P-Touch label maker.

Cut little circles of white artist tape (great stuff that sticks well but comes off easily) to indicate *top*, *up*, or *this end first* on dongles and accessories. I also use the tape to indicate which unbranded transformer goes with which PC accessory. Carry a key-chain flashlight to help you see connectors in dim light.

Lean on the HR department to lean on the IS department to do a better job making PCs more accessible. Why HR? Because some HR departments are genuinely helpful, and others are paranoid about any kind of discrimination proceedings, they'll do what needs to be done. IS staffers may be helpful too, but sometimes they see the issue as one of cost (19-inch monitors cost 50 percent more than 15-inch monitors).

The PC industry isn't alone in its problems. The buttons on stereos and TVs are hard to read in dim light, too. Ditto for room thermostats. And in fancy hotel elevators that have dim lighting and low-contrast brass-on-brass buttons, *both* control panels (to the left and right of the door) are set at wheelchair height. Unfortunately, you can't legislate common sense. **PC**



Most people need at least reading glasses by the time they reach their mid-forties, and the population is aging.

More on the Web:

Join us online and make your voice heard. Talk back to Bill Howard in our *Opinions* section.

www.pcmag.com/opinions

MAKE THIS THE BEST HOLIDAY SEASON WITH ONE OF THE "BEST BUYS OF THE YEAR"* FROM PROGEN.

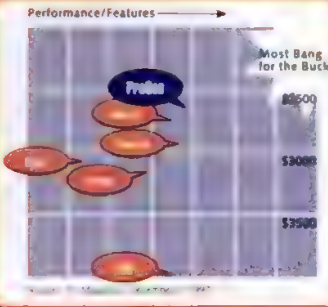
*COMPUTER SHOPPER, TOP 100 PRODUCTS OF 1998



PC World Top 20 Award-Winning System:
"Polaris delivers terrific performance."

— PC World, January and June through November, 1998

Common Features: 512KB Integrated L2 Cache • 56K v.90 Telephony Modem • NEW 36X EIDE CD-ROM Drive • PCI 32 bit 3D Stereo Wavetable Audio Sound • 1.44MB FDD • 2 USB Ports • NEW MS Windows 98 with Win98 Starts Here • MS IntelliMouse • MS Natural Keyboard Elite • ProGen ProCare Warranty (3-Year Limited Parts + 1-Year On-Site)



Atlas X Multimedia solutions

- Intel® 440LX AGPset
- 32MB SDRAM
- 4.3GB Ultra ATA Hard Drive
- ProGen 15" .28dp Digital PnP Monitor
- AGP Video Graphics Card, 4MB SGRAM
- Amplified Stereo Speakers/Microphone
- Microsoft Choice Software (Works 4.5, Bookshelf 98 and Money 98)

Intel® Pentium® II Processor

333MHz \$929

- 128KB Integrated L2 Cache

Intel® Celeron™ Processor

300MHz \$879

- Intel® 440BX AGPset
- 64MB 100 MHz FSB SDRAM
- 6.4GB Ultra ATA Hard Drive
- ProGen 17" Digital PnP Monitor
- 2X AGP Video Graphics Card (featuring Intel® i740 Chipset) 8MB SDRAM
- Amplified Stereo Speakers with Subwoofer/Microphone
- Microsoft Choice Software (Works 4.5, Bookshelf 98 and Money 98)

Intel® Pentium® II Processor

350MHz \$1139

Intel® Pentium® II Processor

400MHz \$1309

Intel® Pentium® II Processor

450MHz \$1499

Polaris Business solutions

- Intel® 440BX AGPset
- Intel® LANDesk® Client Manager
- 64MB 100 MHz FSB SDRAM
- 8.4GB Ultra ATA Hard Drive
- ProGen 17" Digital PnP Monitor
- 2X AGP Video Graphics Card (featuring Intel® i740 Chipset), 8MB SDRAM
- Amplified Stereo Speakers/Microphone
- Microsoft Office 97 Small Business Edition
- * Upgrade to MS Windows NT Workstation v.4.0 - Add \$95
- * Iomega Zip 100MB Internal Drive w/One Cartridge - Add \$85

Intel® Pentium® II Processor

350MHz \$1309

Intel® Pentium® II Processor

400MHz \$1479

- Intel® 440BX AGPset
- Intel® LANDesk® Client Manager
- 128MB 100 MHz FSB SDRAM
- 11GB Ultra ATA Hard Drive
- 19" (18" v.i.s.) .26 dp Digital PnP Monitor
- New 5TB nVidia Riva 128-ZX 8MB 3D 2X AGP Video Card
- Amplified Stereo Speakers with Subwoofer/Microphone
- Microsoft Office 97 Small Business Edition
- * Upgrade to MS Windows NT Workstation v.4.0 - Add \$95
- * Iomega Zip 100MB Internal Drive w/One Cartridge - Add \$85

Intel® Pentium® II Processor

400MHz \$1869

Intel® Pentium® II Processor

450MHz \$2059

Order On-line **24** hours a day/ **7** days a week/ **365** days a year:

www.progen.com

GOING PLACES OVER THE HOLIDAYS? GET THERE SOONER WITH OUR VENTURE NOTEBOOK.

MAXIMUM PORTABILITY

- Intel® mobile Pentium® II Processor, 300MHz

BIG 13.3" TFT DISPLAY

- 13.3" TFT XGA Active Matrix Display

- Expandable to 128MB SDRAM

- 20X Max CD-ROM Drive

- Smart Lithium-Ion Battery

MAXIMUM CONVENIENCE

- Built-in 3.5" FDD

- Intel® mobile Module Architecture

MAXIMUM RELIABILITY

- Built-in 56K Fax/Modem

Venture

Notebook Series

featuring Intel® mobile Pentium® II Processor 300MHz

- 13.3" TFT XGA Active Matrix Display
- Intel® 440BX Chipset, 512K L2 Cache
- 6GB HDD
- 64MB SDRAM
- Built-in 56K bps Fax/Modem
- 4MB SGRAM Graphics Accelerator
- Max 20X CD-ROM Drive
- Touch Pad Pointing Device
- 16-bit SoundBlaster Pro Compatible Stereo sound (supports 3D sound and wavetable)

- Built-in Stereo Speakers and Microphone
- Infrared Module
- CardBus and Zoomed Video Support, NTSC-video Output
- Built-in 3.5" FDD, 2 Type II or 1 Type III PCMCIA Slot
- Smart Lithium-Ion Battery/AC Adapter
- Mobile Car Adapter, Carrying Case
- MS Windows 98 with Win98 Starts Here

- 3-Year Limited Warranty on CPU and Main Memory
- 1-Year Limited Parts and Labor Warranty

\$2299

- 4GB HDD, 64MB SDRAM

Intel® mobile Pentium® II Processor

266MHz \$1999

- 3GB HDD, 32MB SDRAM

Intel® mobile Pentium® II Processor

233MHz \$1749

Extra Values:

- | | | | | | | | |
|------------------------|-------|-------------------|-------|---|-------|--------------------------------|-------|
| • ProGen Carrying Case | \$ 39 | • Port Replicator | \$ 59 | • Additional Lithium-Ion Battery (with system purchase) | \$199 | • DVD Drive w/PCMCIA MPEG Card | Call! |
| • Mobile Car Adapter | \$ 49 | • AC Adapter | \$ 59 | | | | |

ProGen® Technology Inc. 15501 Redhill Avenue, Tustin, CA 92780 Ph: 714/566-9200 Fax: 714/566-9267

BBS: 714/566-9255 E-Mail: webmaster@progen.com.

©1998 ProGen® Technology Inc. ProGen is a registered trademark of ProGen® Technology Inc. Intel, the Intel Inside logo, Pentium and LANDesk are registered trademarks and MMX and Celeron are trademarks of Intel Corporation. All other trademarks are the property of their respective owners. Prices and system configurations are subject to change without notice. *On site service is based on the discretion of ProGen technical support. Leasing Rate will vary depending on state legislation, and is intended for business or corporate use only. 30-day money-back Guarantee (shipping cost not included). Actual products may be different from products in photo. *ProGen ProCare Program is for desktop systems only. ProGen is not responsible for typographical errors.

Choose 287 at www.pcmag.com/infolink

1-800-848-1353

Sales Hours: M-F 6:30 A.M. - 7:00 P.M. PST • Sat. 9:00 A.M. - 3:00 P.M. PST (except holidays)

ProGen®
SYSTEMS

A Division of ProGen Technology Inc.

Works for You.

PROFESSIONAL PCs

IN THIS REVIEW

Aberdeen LLC	122
All Computer Technology	122
American Microsystems	123
Axis Systems	123
Compaq Computer Corp.	123
CompUSA	123
CyberMax Computer Inc.	123
Dell Computer Corp.	123
DMI Computer Technologies	126
DTK Computer Inc.	126
Gateway	126
Hertz Computer Corp.	127
HiQ Computer Systems	127
Initiative Technology Inc.	127
Kingdom Computers	127
Maximus Computers Inc.	127
Mega Computer Systems	127
Micro Express	127
Micron Electronics Inc.	130
MidWest Micro	130
NEC Computer System Division	130
NETIS Technology Inc.	130
nextPC	130
NexTrend Technology Inc.	130
Polywell Computers Inc.	130
Premio Computer Inc.	130
ProGen Systems	130
Quantex Microsystems Inc.	130
Racer Computer Corp.	130
Royal Computer	134
SAG Electronics	134
Sys Technology Inc.	134
Tagram System Corp.	134
Tangent Computer Inc.	134
TigerDirect Inc.	134
Total Peripherals Inc.	134
Unicent Technologies Inc.	134
Unitek Technology Inc.	134
Xi Computer Corp.	134
Zenon Computer Inc.	134
Price/Performance Index	104
Editors' Choice	111
Ratings	111
Performance Tests	114
Summary of Features	118

*PC Magazine Labs tests
40 fast new Windows
98-based systems meant
for business-oriented
or enthusiast power users.*

By Winn L. Rosch

■ Power to spare

The majority of these systems use the new Intel Pentium II/450 CPU or the Pentium II/400 CPU and come with new graphics chip sets from Matrox or nVidia, providing fast 2-D and 3-D graphics.

Join Us Online

for a chart with key results of our new 3D Winbench 99 quality tests, as well as an interactive version of all our benchmark tests.

www.pcmag.com





■ Multimedia-ready

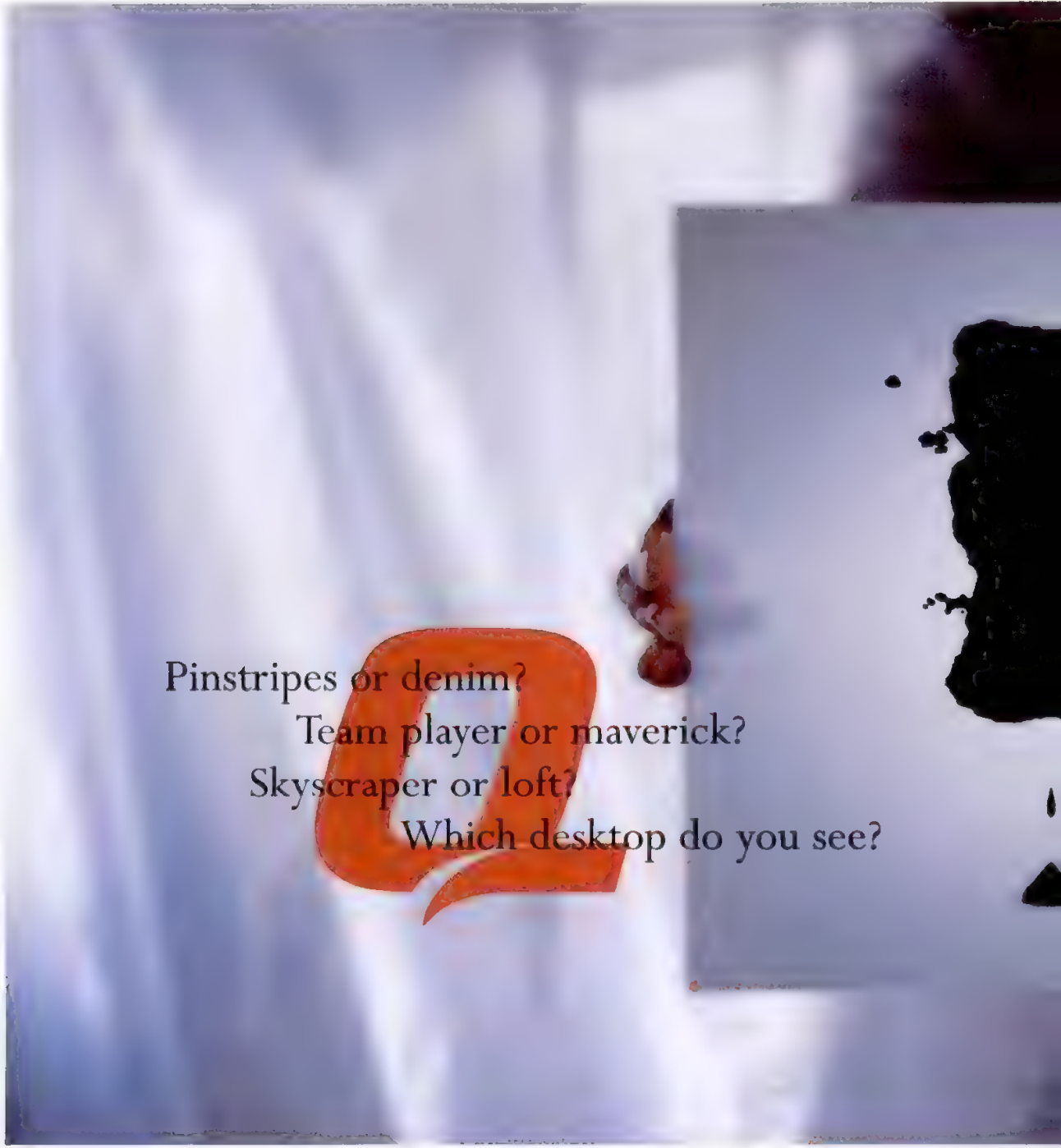
You'll find nearly all of the systems are equipped with DVD drives and top-notch sound, although not all have hardware-based DVD or MPEG-2 decoding. Despite faster processors for Soft DVD, the PCs that have hardware decoding still provide better picture quality on video playback.

■ Great values abound

The average price of fully equipped Pentium II/450 machines in this roundup is \$2,600. In most cases that even includes an extra storage solution such as a 100MB Iomega Zip Drive.

■ Service is a growing differentiator

As a rule, the bigger vendors tend to offer better technical support and include on-site service, but smaller vendors often provide longer warranties and increasingly are offering on-site service as well. If you want software support, ask beforehand, though, because vendor policies vary widely.



Pinstripes or denim?
Team player or maverick?
Skyscraper or loft?
Which desktop do you see?

Self-employed or employee? Corporation or entrepreneur? Do you see a desktop for an enterprise that remains consistent for thousands of users?

That's our Deskpro EP Series. Both now have the latest Intel® Celeron™ and Pentium® II processors, performance graphics

whether yours is fairly buttoned-up **COMPAQ** or the business equivalent of a sweatshirt and

Better answers.™

Deskpro EN Series





© 1997 Compaq Computer Corporation. All rights reserved. Intel Inside and Pentium are registered trademarks and Compaq is a trademark of Intel Corp. Compaq, the Compaq logo and Deskpro are registered trademarks and Better answers is a service mark of Compaq Computer Corporation.

of end-users? That's our Deskpro EN Series. Or a desktop for an office that's seeking the latest technology at the best price?



and bigger hard drives. Making the number one desktop¹ even more popular with any kind of company,

jeans. For more information, contact 1-800-AT-COMPAQ or www.compaq.com/products/desktops/promos/.



Deskpro EP Series

AS A GROUP, THESE 40 multimedia-oriented machines show uniformly high quality in construction, high performance, and good prices. They also hint at the future of the PC industry: The big vendors are doing it all, providing you with fast, reliable systems at a fair price. Which may eventually leave smaller vendors out in the cold, or retreating to highly customized market niches. For now, though, it means you can get a great machine for a great price, whatever your choice of vendor.

The professional machines stand apart from the corporate PCs reviewed later in this issue in several ways. Foremost, they are designed as truly *personal* computers: standalone machines meant for individual use, whether in a networked environment

or not. Although all are well suited to standard business applications and several include network adapters, most have greater strengths in 3-D, multimedia, and entertainment; they don't have the manageability of their corporate kin. Most do have DVD capability, bringing huge data capacities as well as digital quality to home movie viewing, and powerful audio to complement it. Most also come with optional backup media—the Iomega Zip Drive being the most popular, though we saw one 8GB tape backup solution and several CD-RW drive-equipped systems—and disks large enough even for space-hungry digital video, with capacities ranging from 9.6GB to 17.4GB. Professional PCs lack the homey touches of

consumer PCs, such as programmable keyboards, generous software bundles, and ease-of-use features such as quick-setup guides, color-coded cables, and extensive tutorials. We review home PCs in the next issue of *PC Magazine*.

As always, more power is in the pipeline: The Intel Katmai processor, with new 3-D instructions that should improve graphics performance, is only about three months away. But if you need a PC today, you can't do better than the best of these.

REVIEW CRITERIA

We asked each vendor for a top-of-the-line microprocessor (we got Pentium IIs at 400 and 450 MHz as well as a smatter-

Price/Performance Index

For \$2,632 direct, the Editors' Choice-winning Gateway G6-450 gives you top performance and much more. Besides a Toshiba DVD drive with great playback, the system includes a Philips CD-rewritable drive, Boston Acoustics speakers, and a choice of software bundles, including Microsoft Office 97. Thanks to the STB Velocity 4400 AGP graphics card with 16MB of SDRAM and the nVidia RIVA TNT chip set, the G6-450 gives you excellent 2-D and 3-D graphics.

The Micron Millennia 450 MAX earned the top performance/features score on our chart. At \$2,899 (direct), it's more expensive than many in this roundup, but it provides strong performance, especially in graphics, thanks to the Diamond Viper 550 AGP graphics board with 16MB of SDRAM. Micron also offers a choice of software, including Microsoft Office 97 Small Business Edition.

Both vendors earned good scores on our Reader Service and Reliability Survey.

Ratings

Top-rated PCs in the multimedia category have high 3D WinMark and CD-ROM scores, top video playback, MPEG-2 support, and good sound. Systems that scored well on our Business Winstone 99, 3D WinMark 99 and CD-ROM WinMark 99 tests earn *excellent* ratings on the Performance measure. Excellent systems in the Serviceability and upgradability category have free bays and slots, a tool-free chassis, tool-free drive bays, large power supplies, and free IRQs. To rate *excellent* in the Service category, systems must have round-the-clock technical support, long-term warranties, and money-back guarantees. Also, vendors must pay for shipping both ways in case of repair, include on-site service standard, and charge low—or better no—restocking fees. Possible ratings are *excellent*, *good*, *fair*, and *poor*. (See page 111.)



**Quantex customers
are happier than
IBM, Gateway, or
Micron customers.***

Are you?



Results based on a Windows Magazine (Aug '97) 'Technical Support Survey' in which Quantex received a 91% 'Buy Again Rating,' higher than that received by IBM, Micron and Gateway and on PC Magazine (July '98) 'Service and Reliability Survey' in which Quantex received the highest ratings for its customers' 'Tech Support Experience' in 4 out of 5 categories including 'tech was knowledgeable, tech tried everything to help, prompt resolution and got a run-around.' Calculations based on 25 vendors evaluated in the survey.

It's about time you

Quantex systems feature the Intel® Pentium® II processor



Today, Quantex is one of the world's largest direct marketers of computer systems, featuring the Intel® Pentium® II processor. And in the last year, Quantex has consistently placed at or near the top in surveys of customer satisfaction and tech support. As well as winning dozens of product rating awards in the most respected publications.

As more businesses and experts say good things about Quantex, you're bound to wonder, "How good can they be?" There's one way to find out.

DELL NUDGES OUT QUANTEX BY 1% FOR CUSTOMER SATISFACTION. QUANTEX CUSTOMERS VERY HAPPY. MANAGEMENT NOT!.

OK. We may not be number one in total customer satisfaction yet, but we're real close. And we can do better. That's why so many people who have bought Quantex say they'll buy Quantex again. And do. And they tell others. How else could we get this big when

WOULD YOU BUY AGAIN?	
Vendor	% who would buy the same brand
Dell	92%
Quantex	91%
IBM	89%
Micron	81%
Gateway	80%
Acer	74%
Digital	69%
Toshiba	61%
Compaq	58%
Packard Bell	51%
Windows Magazine, 8/97	

most people still don't even know our name?

QUANTEX RATED NUMBER ONE IN TECH SUPPORT. #2-#25 NEED TO TRY HARDER!.

In the most recent *PC Magazine* study, PC owners rated Quantex the leader for tech support based on their own experiences. For the technical knowledge of our people and the promptness of the resolution, no one beat Quantex. And no one came within 10 points

COMPUTER SHOPPER
1997 Direct Channel Achievement Award

PC COMPUTING
1997 Most Valuable Product Award

PC COMPUTING
5 Star Rating (11/98)

PC COMPUTING
5 Star Rating (10/98)

PC WORLD
Best Buy Award (10/98)

PC WORLD
Best Buy Award (9/98)

PC WORLD
#1 Best Buy Award (8/98)

PC WORLD
#1 Best Buy Award (7/98)

experienced Quantex.



for "tech tried everything to help." Not Dell. Not Gateway. Not Micron. Not IBM. Not Compaq.

Hey, we may not be a household name yet. So we go the extra mile. And our customers notice it.

TECH SUPPORT EXPERIENCE

Vendor	Tech was knowledgeable	Tech tried everything to help	Prompt resolution	Got a run-around
Quantex	57%	59%	49%	9%
Micron	56%	47%	43%	9%
Gateway	54%	48%	45%	10%
Dell	54%	43%	49%	10%
IBM	41%	33%	36%	15%
Compaq	37%	30%	30%	17%
Average*	40%	33%	32%	16%

"Service and Reliability Survey," PC Magazine, July 1998
* calculations based on all 25 PC vendors evaluated in the survey

QUANTEX SYSTEMS KEEP WINNING. COMPETITION AT A LOSS.

Obviously, it takes a lot more than great support to generate great customer satisfaction. And more than VERY competitive prices. It takes great computers featuring the Intel Pentium® II processor. And Quantex configures them with industry-standard "enhancements" that make Quantex systems regular winners in the "best buy" category.



**CALL TODAY
AND ORDER**

800-346-6572

www.quantex.com/pcmag

PC WORLD
#1 Best Buy
Award (6/98)

**WINDOWS
MAGAZINE**
WINLIST Award
(10/98)

**WINDOWS
MAGAZINE**
WINLIST Award
(7/98)

C|NET ONLINE
Editors' Choice
Award (8/98)

C|NET ONLINE
Editors' Choice
Award (6/98)

PC PORTABLES
Best Buy Award
(3/98)

PC COMPUTING
4-star "Torture Test"
Survivor (4/98)

PC COMPUTING
4-star Rating
(9/98)

*Results based on PC Magazine (July '98) "Service and Reliability Survey" in which Quantex received the highest ratings for its customers' "Tech Support Experience" in 4 out of 5 categories including "tech was knowledgeable, tech tried everything to help, prompt resolution and got a run-around." Calculations based on 25 vendors evaluated in the survey.



Systems with better



BETTER MANAGEABILITY MEANS BETTER PRODUCTIVITY FOR YOUR BUSINESS.

Quantex Business Desktops bring enterprise management technology, traditionally implemented by large corporations, to businesses of all sizes—including yours. Built according to industry-standard initiatives such as Wired for Management, DMI 2.0, PC 98, LDCM and ACPI, these desktops are designed to lower your total cost of ownership. They also incorporate capabilities for improved asset management and remote configurations and diagnostics. Plus, our innovative **QSentry technology** assures unsurpassed confidence and security by constantly monitoring the health of Quantex PCs. If you want to do something more productive, install Quantex Business Desktops. **Starting at just \$999**

TAKE A FLAT APPROACH TO YOUR WORK

Looking to provide your business with a better view? Quantex gives it to you with its state-of-the-art 15" LCD flat-panel monitors with on-screen controls. Engineered with advanced technologies, these active matrix TFT flat-panels produce clear, crisp pictures with bright vivid colors, and include landscape and portrait modes. All this while saving approximately 75% of the desk space and up to 70% of the power used by traditional CRT's. *Available as upgrade only.*



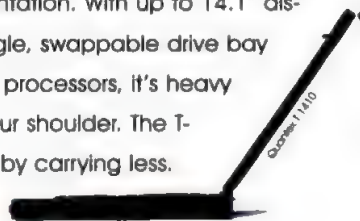
15" LCD Flat Panel

NOT HAPPY STAYING IN ONE PLACE? GREAT!

THE "T" SERIES: TRAVEL LIGHTER AND ARRIVE HAPPIER.

It's time to stop thinking about notebooks as a compromise between mobility and performance. Quantex presents the T-Series Notebook, full-featured power in a lightweight mobile computing solution. It packs huge performance and flexibility into a lean 1.43" thin, 6.4-pound system[™], perfect for working on a plane or during an important presentation. With up to 14.1" displays, AGP graphics, a single, swappable drive bay and the fastest Pentium[®] II processors, it's heavy on features but light on your shoulder. The T-Series: start packing more by carrying less.

Starting at just \$1999



THE "I" SERIES: A DESKTOP AND NOTEBOOK IN ONE.

Take the best of both worlds and put it into one powerful system. You'll have the Quantex I-Series Notebook, designed to make work easy—and you happy. Rip through projects with fast Pentium[®] II processors, tons of SDRAM, long-lasting 12-cell Lithium Ion batteries and more. Plus, the built-in dual drive bay design allows for simultaneous drive use and added functionality. And with DVD and an ATI AGP 3D 8MB graphics accelerator, you'll discover incredibly brilliant ways to experience presentations and dynamic multimedia on the stunning 14.1" display. For extreme computing power and performance, the Quantex I-Series Notebook doesn't just replace your desktop. It humbles it.

Starting at just \$2299



Quantex I 1400

CALL 800-346-6572 TO ORDER OR

performance built in.

BUSINESS DESKTOPS

QP6/333 SB-1c \$999

Business lease: \$35/Mo.

- Intel® Celeron® Processor 333MHz
- 32MB SDRAM Memory / 128KB Secondary Cache
- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 15" Digital Monitor (13.8" viewable)
- 64-bit 3D PCI Graphics Card with 4MB SDRAM
- New Intel Pro 10/100 PCI Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- 32X Max EIDE CD-ROM Drive
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS Mouse
- MS Windows 98 w/Microsoft Plus 98
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- OSentry Technology (Including Intel LANDesk Client Manager V.3.1)
- Upgrade to Windows NT Workstation 4.0 for \$99

QP6/333 SB-1(w/ Pentium® II Processor).....\$1049

QP6/350 SB-1(w/ Pentium® II Processor).....\$1099

MS OFFICE '97 SBE v2.0

MS Plus 98 ■ McAfee VirusScan, File Cleaner, Start Menu cleaner, Compressed Folders, Deluxe CD Cleaner, MS Pictures! It! Express, Lose your marbles, Spider Solitaire, Golf 1998 fee, Desktop Theme

QP6/350 SB-2 \$1399

Business lease: \$49/Mo.

- Pentium® II Processor 350MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor w/ OSD (15.8" viewable)
- Upgrade to 17" Monitor w/NEC ChromaClear CRT for \$79
- Intel740™ 3D 2X AGP Graphics with 8MB SDRAM
- New Intel Pro 10/100 PCI Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- 32X Max EIDE CD-ROM Drive
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98 w/Microsoft Plus 98
- Microsoft Office '97 SBE v2.0
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- OSentry Technology (Including Intel LANDesk Client Manager V.3.1)
- Upgrade to Windows NT Workstation 4.0 for \$99
- Add 56K V.90 Fax/Modem* for \$39

QP6/333 SB-2(w/ Pentium® II Processor).....\$1349

QP6/400 SB-2(w/ Pentium® II Processor).....\$1549

QP6/400 SB-3 \$1649

Business lease: \$58/Mo.

- Pentium® II Processor 400MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor w/OSD & NEC ChromaClear CRT (16.0" viewable, 25 dp, 1600x1200 max. resolution)
- Intel740™ 3D 2X AGP Graphics with 8MB SDRAM
- New Intel Pro 10/100 PCI Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- 32X Max EIDE CD-ROM Drive
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows NT 4.0 Workstation
- Microsoft Office '97 SBE v2.0
- Upgrade to MS Office '97 Professional for \$199
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- OSentry Technology (Including Intel LANDesk Client Manager V.3.1)
- Add 56K V.90 Fax/Modem* for \$39
- Upgrade to 15.0" LCD Flat-Panel Display for \$549

QP6/350 SB-3(w/ Pentium® II Processor).....\$1499

QP6/450 SB-4 \$2099

Business lease: \$74/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 10.2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/ OSD (18.1" viewable), 1600x1200, 26dp
- New Ultra-Fast #9 Revolution IV 128-bit 3D ZK AGP Graphics w/32MB
- New Intel Pro 10/100 PCI Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- 32X Max EIDE CD-ROM Drive
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows NT 4.0 Workstation
- Microsoft Office '97 SBE v2.0
- Upgrade to MS Office '97 Professional for \$199
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- OSentry Technology (Including Intel LANDesk Client Manager V.3.1)
- Add 56K V.90 Fax/Modem* for \$39
- Upgrade to 15.0" LCD Flat-Panel Display for \$399

QP6/400 SB-4(w/ Pentium® II Processor).....\$1899

BUSINESS NOTEBOOKS

Quantex T-1310 \$1999

Business lease: \$70/Mo.

- Pentium® II processor 233MHz
- Intel Mobile Module (I.M.M.) Architecture
- New Ultra-Thin Design (12.44"x9.84"x1.37")
- 13.3" XGA Active Matrix Display
- 32MB SDRAM / 512KB Secondary Cache
- 4GB Ultra ATA HD
- 56K V.90 Fax/Modem*
- 24X Modular CD-ROM Drive / 3.5" Modular Floppy Drive
- New NeoMagic NM65 128-bit AGP Video
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98 / Corel Office Suite 8
- Quantex Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

T-1310 w/Pentium II processor 266MHz.....\$2199

OPTIONS: Mini-Docking Station \$149 • 2nd Lithium Ion Battery \$129 • PCMCIA NIC \$129 • Quantex Deluxe Carrying case \$99

Quantex T-1400 \$2499

Business lease: \$88/Mo.

- Pentium® II processor 266MHz
- Intel Mobile Module (I.M.M.) Architecture
- New Ultra-Thin Design (12.44"x9.84"x1.43")
- 14.1" XGA Active Matrix Display
- 64MB SDRAM / 512KB Secondary Cache
- 4GB Ultra ATA HD
- 56K V.90 Fax/Modem*
- 24X Modular CD-ROM Drive / 3.5" Modular Floppy Drive
- New NeoMagic NM65 128-bit AGP Video
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- Mini-Docking Station
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98 / Microsoft Office '97 SBE v2.0
- Quantex Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

T-1400 w/Pentium II processor 300MHz.....\$2699

Quantex T-1410 \$2849

Business lease: \$100/Mo.

- Pentium® II processor 300MHz
- Intel Mobile Module (I.M.M.) Architecture
- New Ultra-Thin Design (12.44"x9.84"x1.43")
- 14.1" XGA Active Matrix Display
- 80MB SDRAM / 512KB Secondary Cache
- 6GB Ultra ATA HD
- 56K V.90 Fax/Modem*
- New 2X Modular DVD-ROM Drive & 3.5" Floppy Drive
- New NeoMagic NM65 128-bit AGP Video
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98
- Microsoft Office '97 SBE v2.0
- Quantex Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

Quantex T-1411 \$3099

Business lease: \$104/Mo.

- Pentium® II Processor 300MHz
- Intel Mobile Module (I.M.M.) Architecture
- New Ultra-Thin Design (12.44"x9.84"x1.43")
- 14.1" XGA Active Matrix Display
- 96MB SDRAM / 512KB Secondary Cache
- 6GB Ultra ATA HD
- 56K V.90 Fax/Modem*
- New 2X Modular DVD-ROM Drive & 3.5" Floppy Drive
- New NeoMagic NM65 128-bit AGP Video
- Integrated 16-bit Stereo Sound and Speakers
- Two Smart Lithium Ion Batteries
- Mini-Docking Station
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98 / Microsoft Office '97 SBE v2.0
- Quantex Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

Quantex I-1400 \$2299

Business lease: \$81/Mo.

- Pentium® II processor 266MHz
- Intel Mobile Module (I.M.M.) Architecture
- 14.1" XGA Active Matrix Display
- 64MB SDRAM / 512KB Secondary Cache
- 4GB Ultra ATA HD
- 56K V.90 Fax/Modem*
- Removable 24X CD-ROM Drive & 3.5" Floppy Drive
- New ATI Rage Lt Pro 3D AGP Video w/8MB
- New ESS 3D Wavetable Surround Sound and Speakers
- New Long-Lasting 12-Cell Smart Lithium Ion Battery
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98 / Corel Office Suite 8
- Quantex Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

I-1400 w/Pentium II processor 300MHz.....\$2549

Quantex I-1411 \$3399

Business lease: \$114/Mo.

- Pentium® II Processor 300MHz
- Intel Mobile Module (I.M.M.) Architecture
- 14.1" XGA Active Matrix Display
- 128MB SDRAM / 512KB Secondary Cache
- 8GB Ultra ATA HD
- 56K V.90 Fax/Modem*
- New Removable 2X DVD-ROM Drive & 3.5" Floppy Drive
- New ATI Rage Lt Pro 3D AGP Video w/8MB
- New ESS 3D Wavetable Surround Sound and Speakers
- New Two Long-Lasting 12-Cell Smart Lithium Ion Batteries
- Mini-Docking Station
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98 / Microsoft Office '97 SBE v2.0
- Quantex Carrying Case
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor limited warranty on all other components

I-1411 w/Pentium II processor 266MHz.....\$3199



**CALL TODAY
AND ORDER**

QUANTEX

800-346-6572

www.quantex.com/pcmag

VISIT WWW.QUANTEX.COM/PCMAG

VALUE MULTIMEDIA

QP6/333 M-1c \$1099

Business lease: \$39/Mo.

- Intel® Celeron® Processor 333MHz
- 64MB SDRAM Memory / 128KB Secondary Cache
- 6 4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 15" Digital Monitor (13.8" viewable)
- 64-Bit 3D PCI Graphics Accelerator with 4MB
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98 w/Microsoft Plus 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/333 M-1x(with Pentium II processor).....\$1179
QP6/350 M-1x(with Pentium II processor).....\$1249

SOFTWARE: Corel Office Suite 8 • Internet the City • Compton's Interactive Encyclopedia • Body Works 5.0 • Amazon Trail II • MS Money '97 (pre loaded only)
American Heritage Talking Dictionary • Dr. Solomons Find-Virus (pre loaded only) • Compton's Reference Collection • MS Internet Explorer 4.0
MS Plus 98 McAfee VirusScan, File Cleaner, Start Menu cleaner, Compressed Folders, Deluxe CD Cleaner, MS Pictures It! Express, Lose your marbles, Spider Solitaire, Golf 1998 Ite, Desktop Theme

QP6/350 M-2x \$1449

Business lease: \$51/Mo.

- Pentium® II Processor 350MHz/100MHz Front Side Bus
- 64MB SDRAM Memory / 512KB Secondary Cache
- 8 4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor w/OSD (15.8" viewable)
- Toshiba PMAC27 3D Media Accelerator w/8MB VRAM
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- New 3rd-Generation 4.8X DVD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98 w/Microsoft Plus 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/333 M-2x(with Pentium II processor).....\$1399
QP6/400 M-2x(with Pentium II processor).....\$1599

QP6/400 M-3x \$1699

Business lease: \$60/Mo.

- Pentium® II Processor 400MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 10 2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor w/OSD (15.8" viewable)
- Upgrade to 17" Monitor w/NEC ChromaClear CRT for \$79
- Toshiba PMAC27 3D Media Accelerator w/8MB VRAM
- Internal 100MB Zip Drive with one cartridge
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- New 3rd-Generation 4.8X DVD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98 w/Microsoft Plus 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

QP6/350 M-3x(with Pentium II processor).....\$1549
QP6/450 M-3x(with Pentium II processor).....\$1899

QP6/450 M-4x \$2049

Business lease: \$72/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 96MB PC100 SDRAM Memory/512KB Secondary Cache
- 10 2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- Intel740 3D 2X AGP Graphics with 8MB SDRAM
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- New 3rd-Generation 4.8X DVD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98 w/Microsoft Plus 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**
- Add Altec Lansing ACS-251 Subwoofer for \$39
- Upgrade to 15.0" LCD Flat-Panel Display for \$399

QP6/400 M-4x(with Pentium II processor).....\$1849

POWER MULTIMEDIA

QP6/350 SM-1x \$1449

Business lease: \$53/Mo.

- Pentium® II Processor 350MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 10 2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor w/OSD (15.8" viewable)
- Upgrade to 17" Monitor w/NEC ChromaClear CRT for \$79
- Intel740 3D 2X AGP Graphics with 8MB SDRAM
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows 98 w/Microsoft Plus 98
- Power Multimedia Software Bundle
- Microsoft Office '97 SBE v2.0
- 3-year limited warranty with 1-year On-Site Service**

QP6/400 SM-1x(with Pentium II processor).....\$1649

SOFTWARE: MS Office '97 Small Business Edition v2.0 • MS Money '97 (pre loaded only) • Office Mate • Day Planner Pro • Power Business Plans • Form Designer Pro
• Project Manager Pro • Labels Unlimited • Compton's Reference Collection • Dr. Solomons Find Virus (pre-loaded only) • MS Internet Explorer 4.0
MS Plus 98 McAfee VirusScan, File Cleaner, Start Menu cleaner, Compressed Folders, Deluxe CD Cleaner, MS Pictures It! Express, Lose your marbles, Golf 1998 Ite, Desktop Theme

QP6/400 SM-2x \$1899

Business lease: \$67/Mo.

- Pentium® II Processor 400MHz/100MHz Front Side Bus
- 96MB PC100 SDRAM Memory / 512KB Secondary Cache
- 13 5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor w/OSD & NEC ChromaClear CRT
- (16.0" viewable, 25 dp, 1600x1200 max resolution)
- New 3Dfx 128-bit Voodoo Banshee 3D AGP Video w/16MB
- Based on award-winning Voodoo2 3D Technology
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- New 3rd-Generation 4.8X DVD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-45 1 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98 w/Microsoft Plus 98
- Power Multimedia Software Bundle
- Microsoft Office '97 SBE v2.0
- 3-year limited warranty with 1-year On-Site Service**
- Upgrade to 15.0" LCD Flat-Panel Display for \$549

QP6/350 SM-2x(with Pentium II processor).....\$1749
QP6/450 SM-2x(with Pentium II processor).....\$2049

QP6/400 SM-3x \$2149

Business lease: \$75/Mo.

- Pentium® II Processor 400MHz/100MHz Front Side Bus
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- 13 5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- New Ultra-Fast #9 Revolution IV 128-bit 3D 2X AGP Graphics w/32MB
- Internal 100MB Zip Drive with one cartridge
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-45 1 Speakers with subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98 w/Microsoft Plus 98
- Power Software Bundle / Microsoft Office '97 SBE v2.0
- 3-year limited warranty with 1-year On-Site Service**
- Upgrade to 15.0" LCD Flat-Panel Display for \$399

QP6/350 SM-3x(with Pentium II processor).....\$1999
QP6/450 SM-3x(with Pentium II processor).....\$2299

QP6/450 SM-4x \$2499

Business lease: \$88/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- New 16 6GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- New 3Dfx 128-bit Voodoo Banshee 3D AGP Video w/16MB
- Based on award-winning Voodoo2 3D Technology
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- New 3rd-Generation 4.8X DVD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- New Altec-Lansing ADA-305 Dolby 3D Surround Sound Speakers with subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98 w/Microsoft Plus 98
- Power Multimedia Software Bundle
- Microsoft Office '97 SBE v2.0
- 3-year limited warranty with 1-year On-Site Service**
- Upgrade to 15.0" LCD Flat-Panel Display for \$399

QP6/400 SM-4x(with Pentium II processor).....\$2299

SUPER MULTIMEDIA

QP6/450 M-4x SE \$2499

Business lease: \$77/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- 13 5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- Intel740 3D 2X AGP Graphics with 8MB SDRAM
- Internal 100MB Zip Drive with one cartridge
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- New 3rd-Generation 4.8X DVD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-90 Speakers
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98 w/Microsoft Plus 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**
- Add Altec Lansing ACS-251 Subwoofer for \$39
- Upgrade to 15.0" LCD Flat-Panel Display for \$399

QP6/400 M-4x SE(with Pentium II processor).....\$1999

QP6/450 SM-4x SE \$2849

Business lease: \$100/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- 16 6GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 21" Monitor w/OSD (20.0" viewable), 1600x1200
- New Ultra-Fast #9 Revolution IV 128-bit 3D 2X AGP Graphics w/32MB
- Internal 100MB Zip Drive with one cartridge
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- New Altec-Lansing ADA-305 Dolby 3D Surround Sound Speakers & subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS IntelliMouse
- MS Windows 98 w/Microsoft Plus 98
- Power Multimedia Software Bundle
- Microsoft Office '97 SBE v2.0
- 3-year limited warranty with 1-year On-Site Service**

QP6/400 SM-4x SE(with Pentium II processor).....\$2649

M-SERIES BEST BUY

QP6/450 Best Buy \$1999

Business lease: \$70/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 10 2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- Intel740 3D 2X AGP Graphics with 8MB SDRAM
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- New 3rd-Generation 4.8X DVD-ROM Drive
- SoundBlaster AudioPCI 64V Wavetable 3D Sound
- Altec-Lansing ACS-45 1 Speakers w/Subwoofer
- Quantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98 w/Microsoft Plus 98
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**
- Add Altec Lansing ACS-251 Subwoofer for \$39
- Add a Internal Zip Drive for \$ 79

GAMING BEST BUY

QP6/450 GX-2 \$2499

Business lease: \$88/Mo.

- Pentium® II Processor 450MHz/100MHz Front Side Bus
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- 13 5GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 19" Monitor w/OSD (18.1" viewable), 1600x1200, 26dp
- Intel740 3D 2X AGP Graphics with 8MB SDRAM
- Internal 100MB Zip Drive with one cartridge
- 56K V90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- New 3rd-Generation 4.8X DVD-ROM Drive
- Aureal "A3D" 3D Postpositional PCI Sound
- 3Dfx Voodoo2 based 3D Game Accelerator w/12MB
- MS SideWinder 3D Pro Joystick
- New Altec-Lansing ADA-305 Dolby 3D Surround Sound Speakers & subwoofer
- Quantex ATX Mid Tower Case
- MS Natural Keyboard Elite with MS Mouse
- MS Windows 98 w/Microsoft Plus 98
- Value Multimedia Software Bundle
- Activision Game Titles: Battlezone, Heavy Gear Interstate 76 w/Nitro Pack
- 3-year limited warranty with 1-year On-Site Service**

QP6/400 GX-2(with Pentium II processor).....\$2299



© 1998 Quantum Microsystems, Inc. All Rights Reserved. 4000 Pierce Street, Scottsdale, AZ 85267. Sales Hours M-F 9 a.m. - 5 p.m. (EST). Sat. 9 a.m. - 6 p.m. All desktop system sales are subject to Quantum's three year limited warranty and terms and conditions of sale. The three year limited warranty includes first year parts and labor, second and third year parts only warranty. **No on-site service is available outside of the continental USA. On-site service is provided at the sole discretion of Quantum. A diagnostic determination for on-site service must be made by a Quantum technician. On-site service is provided by an independent third party provider. For details on our warranty or monitor back guarantee call or write us. Other peripherals such as printers, joysticks, etc., are covered by manufacturer's warranty. Software titles are subject to change and cannot be substituted. All prices and configurations are subject to change without notice or obligation and do not include shipping or sales tax. All returned items must have a unique IBM number issued by Quantum and be in original packaging. 30 day conditional return back policy, does not include return freight or original shipping/handling charges. *Quantex 3040s fax/modems support the future ITT V.90 standard. Maximum transmission speed of up to 56kbps when downloading and 33.6kbps when uploading data. Actual speeds may vary depending on line conditions and current FCC restrictions. *Height and weight dimensions refer to Quantum T-Series Notebook with 14.1" display and floppy disk drive module. **Note: On LAN is currently not supported through Systems. System temp., voltage, and fan speed monitoring available only on Pentium III processor based SB-Series. Quantum is not responsible for errors in typographical or photographic (Intel, Pentium and the Intel Inside logo are registered trademarks and IBM and Celeron are trademarks of Intel). All other company trademarks are trademarks of each respective company.

CALL TODAY AND ORDER

800-346-6572

www.quantex.com/pcmag

ing of slower Intel-compatible chips), 128MB of RAM, at least a 10GB hard disk, a CD or DVD drive, a 2-D and 3-D graphics board with at least 8MB of memory, a 17-inch monitor minimum, a PCI-based modem, and a PCI-based audio system with speakers.

Of the machines that met our criteria, the price range (all prices quoted are selling prices and include monitor) proved wide, from \$1,299 (the Micro Express) to \$4,495 (the Aberdeen). And our conclusion was inescapable: The biggest manufacturers—in this story Compaq, Dell, Gateway, Micron, and NEC—delivered the best combination of what you really need: multimedia features, performance, support, plus serviceability and

upgradability. For a quick rundown on how vendors stack up in these categories, see our new ratings. Two large vendors, Hewlett-Packard and IBM, chose not to participate.

Our Contributors: WINN L. ROSCH is a contributing editor of *PC Magazine*. ROBERT S. ANTHONY is a senior writer at *PC Magazine*. MARY E. BEHR is a staff editor, and RICHARD BROWN is an editorial researcher at *PC Magazine*. FRANK J. EVANS is a frequent contributor; CARLOS CARILLO, RAYMOND M. PADILLA, and ASA SOMERS are freelance writers. RICH FISCO was the project leader, and ANUSH YEGYAZARIAN was the associate editor in charge of this story.

Editors' Choice

• Gateway G6-450



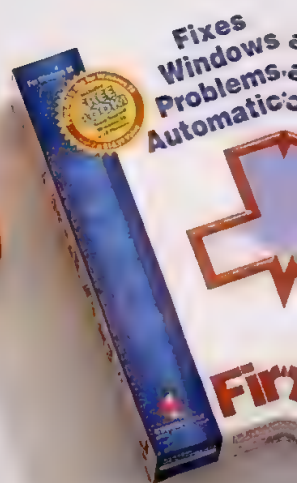
Our Editors' Choice for professional systems is the Gateway G6-450 (\$2,632 direct). It has everything you want: a fast 450-MHz Pentium II CPU, a top 2-D and 3-D graphics card, the STB Velocity card with the nVidia RIVA TNT chip set and 16MB of SDRAM, a 9.6GB IBM hard disk, a 56-Kbps modem, and a 19-inch monitor. With the G6-450, you also get a second-generation DVD drive with good playback quality, Boston Acoustics speakers with a subwoofer, and a rewritable-CD drive. All of these components add up to top performance. The unit's case is easy to service and has room for upgrades; you also get your choice of software, including Microsoft Office 97 Small Business Edition. Gateway offers a complete Web site full of information, round-the-clock technical support, and a three-year parts-and-labor warranty, plus one year of on-site support. Gateway earned a mix of above-average and average scores on our latest Service and Reliability Survey.

Two Pentium II/450-based systems earn an honorable mention: the Dell Dimension XPS R450 (\$2,649 direct) and the Micron Millennia 450 MAX (\$2,899 direct). Both were good performers and come with nVidia RIVA TNT-based graphics, DVD drives, and Iomega Zip Drives. The Dimension has a 17-inch monitor and a 9.6GB disk, where the Millennia has a 19-inch monitor and a 13.8GB disk. The Dimension uses Altec Lansing speakers, and the Millennia boasts the new space-saving Monsoon MM-1000 speakers with subwoofer. Dell earned top scores on our Service and Reliability Survey, while Micron earned a mix of average and above-average scores.

Ratings

	Multimedia	Serviceability/ upgradability	Performance	Service offerings
Aberdeen Inverness D50	Good	Excellent	Fair	Good
ACT Brillianta P6II-400PE	Good	Good	Good	Fair
American Multisystems InfoGold PII400	Poor	Good	Poor	Good
Axis Orion 100X DVD 400	Fair	Fair	Good	Excellent
Compaq Deskpro EP	Excellent	Fair	Excellent	Excellent
CompUSA PC American Pro AP450L-SE	Poor	Good	Poor	Good
CyberMax Home Theater	Good	Good	Fair	Good
Dell Dimension XPS R450	Excellent	Good	Excellent	Excellent
DMI Thunder II	Poor	Fair	Poor	Fair
DTK APRI-80M/P450	Fair	Good	Good	Good
Gateway G6-450	Excellent	Excellent	Excellent	Excellent
Hertz PII 400	Poor	Good	Poor	Fair
HiQ Impact 2000	Good	Fair	Fair	Good
Initiative ITI-PCE400	Poor	Good	Poor	Fair
Kingdom Pinnacle K6-II 3D 300	Poor	Fair	Poor	Good
Maximus PowerMax DVD P450XP	Fair	Good	Fair	Good
Mega Impact PII400 128Pro FMX	Fair	Fair	Good	Good
Micro Express MicroFlex-K6-2/Pro	Poor	Good	Poor	Excellent
Micron Millennia 450 MAX	Excellent	Excellent	Excellent	Excellent
MidWest Micro Multimedia Pro 450	Poor	Good	Poor	Excellent
NEC Direction SP E450	Excellent	Good	Excellent	Good
NETIS Professional BestBuy	Poor	Good	Fair	Fair
nextPC N7-K62-350	Poor	Fair	Poor	Good
NexTrend NexStar-400PCP	Poor	Fair	Fair	Good
Polywell Poly 8450BU	Good	Good	Good	Good
Premio Apollo BX400	Good	Fair	Fair	Good
ProGen Discover MPEGII PII450	Good	Fair	Excellent	Good
Quantex QP6/450 SM-4x SE	Good	Excellent	Good	Excellent
Racer Talladega 400	Poor	Good	Poor	Good
Royal Exciting Professional	Poor	Good	Fair	Good
SAG STA Dual Power Station	Poor	Good	Poor	Good
Sys Performance Pro 450BADD-R1	Excellent	Good	Excellent	Excellent
Tagram Thunderbolt H2750	Good	Good	Good	Good
Tangent Medallion 450X	Excellent	Good	Excellent	Good
TigerDirect Tiger K-Series 333 3D Plus	Poor	Good	Poor	Fair
Total Peripherals Serengeti 400	Good	Fair	Good	Good
Unicent Extreme Z300 3D	Fair	Good	Poor	Good
Unitek Tailwind UT-PII400	Poor	Fair	Fair	Fair
Xi 400 MTower GSP	Good	Good	Good	Good
Zenon Dream Media Pro	Good	Good	Good	Good

What's the fun of sampling just one



when you can score all of them?

tODAY IS YOUR LUCKY DAY. WE'RE PUTTING EVERYTHING YOUR PC NEEDS TO SECURE, PROTECT AND OPTIMIZE FOR THE NEW MILLENNIUM IN ONE BOX—MCAFFEE OFFICE. HERE'S THE BEST PART: IT'S VALUED AT OVER \$399, EXCEPT YOU ONLY HAVE TO PAY AROUND **\$99***

MCAFFEE OFFICE INCLUDES VIRUSSCAN 4.0, THE #1 VIRUS DETECTION AND REMOVAL SOFTWARE, AND FIRST AID, WHICH AUTOMATICALLY CORRECTS THOUSANDS OF PROBLEMS AND PREVENTS SYSTEM CRASHES. YOU ALSO GET NUTS & BOLTS '98, WHICH INCLUDES EVERYTHING YOU NEED TO CLEAN, OPTIMIZE, MONITOR AND ANALYZE YOUR SYSTEM AND SOFTWARE. AND THE



YEAR 2000 CHECKER WILL GET THE BUGS OUT, SO YOU CAN RING IN THE TURN OF THE CENTURY WITHOUT A CARE IN THE WORLD.

BASICALLY, IF IT'S NOT IN MCAFFEE OFFICE, YOUR PC DOESN'T NEED IT. FOR MORE INFORMATION, VISIT US AT WWW.MCAFEE.COM OR CALL 800-332-9966, DEPT. 1345.



BENCHMARK TESTS

How We Tested



We tested systems in two main categories: professional PCs (running Windows 98 with 128MB of RAM) and corporate PCs (see "Corporate PCs" in this issue).

We subdivided the corporate PCs into mainstream PCs (running Windows 95 with 64MB of RAM) and high-end systems (running Windows NT 4.0 with 128MB of RAM). Each system had a 4GB or larger hard disk. We stripped each system's startup configuration of all processes or tasks except for Systray, Explorer, graphics-card control panels, DMI software, and ActiveX controls.

For Windows NT 4.0 systems, we installed Service Pack 3, then installed the TCP/IP stack required by High-End Winstone 99. For Windows 95 and 98 systems, we defragmented the hard disk before each test and let Windows 95 and 98 manage virtual-memory

settings. We installed DirectX 6.0 on systems running 3D WinMark 99.

We developed an inspection script to test DMI implementations on the corporate systems. We used two Micron Millennia Pentium/166 PCs for these test-beds and loaded them with Windows NT 4.0 Server. We then loaded Intel's LANdesk Client Manager 3.3 with the Administrator's Console. All corporate systems were attached to an internal hub along with the two test-bed servers. Using the Administrator's Console, we looked at each PC to determine if some basic DMI features were implemented correctly for remote management. We looked at features like chassis intrusion, temperature, fan, and voltage monitoring and their associated alarms. We also looked at remote power on/off and Alert on LAN functionality.

Please see this issue's PC Tech column in the Solutions Section (page 351) for full details on the new benchmark tests.

CLUSTERED PRICES

At a given level of performance and equipment, price—formerly an important advantage of second-tier vendors—no longer sharply distinguishes the name brands from the relative unknowns.

Let's get to the bottom line: The average price for the 17 machines here equipped with 450-MHz Pentium IIs is about \$2,600. Slice off 50 MHz and you can trim \$200. All of the major manufacturers had comparable prices once you subtract the cost of extras like larger monitors, cartridge disks, and backup systems—although many systems, including our Editors' Choice-winning Gateway G6-450, were well equipped for about \$2600. Most smaller makers also targeted this level. Only a few went wildly high (typically by adding options) or low (by skimping on processing power).

If you're willing to sacrifice amenities like support and service and you don't care about performance, you can land a 450-

BENCHMARK TESTS Professional PCs

The top-performing systems, from NEC, Polywell, and Sys, combined Pentium II/450 processors, fast disks, and fast 2-D graphics. The Poly got a big boost from a 10,000-rpm Seagate Cheetah disk while the other leaders used 7,200-rpm IDE disks.

The recent release of DirectX 6.0 made for difficult testing of 3-D performance, because graphics drivers were very new, and some were unstable. Because of time constraints we were unable to get the units from DMI, Initiative Technology, Kingdom Computers, Micro Express, Midwest Micro, SAG, TigerDirect, and Unitek to run our 3D WinMark suite. By the time you read this, vendors should have fixed the problems. Of the systems that could produce 3D WinMark scores, those that used 3-D cards based on the Nvidia RIVA TNT chip took first place; Nvidia RIVA TNT-based PCs also topped our 2-D graphics tests. Our slowest performers on the 3D WinMark tests were systems based on the ATI 3D Rage chip sets; ATI was unable to get us DirectX 6.0 drivers in time, so we ran the test with DirectX 5 drivers, which are unoptimized for features examined in our tests.

Both the Aberdeen and Mega PCs had Pentium II/400 CPUs with clock speeds pushed up to 412 MHz. We reset the clocks and tested them at their proper speeds.

High Score: 501

Low Score: 222

Average Score: 260

Editors' Choice: Gateway G6-450

	2D Business Winstone 99	2D 3D WinMark 99
Aberdeen Inverness D50 (PII/400)	21.9	347
ACT Brilliante P6II-400PE	22.5	371
American MultiSystems InfoGold PII400	20.9	133
Axis Orion 100X DVD 400	22.6	309
Compaq Deskpro EP (PII/450)	23.8	501
CompUSA PC American Pro AP450L-SE	20.8	242
CyberMax Home Theater (AMD K6-2/350)	17.1	343
Dell Dimension XPS R450	23.2	500
DMI Thunder II (PII/400)	20.9	N/A
DTK APRI-80M/P450	23.2	297
Gateway G6-450	23.8	482
Hertz PII 400	20.8	132
HiQ Impact 2000 (PII/400)	21.5	373
Initiative ITI-PCE400	20.8	N/A
Kingdom Pinnacle K6-II 3D 300 (AMD K6-2/300)	17.3	N/A
Maximus PowerMax DVD P450XP	23.5	262
Mega Impact PII400 128Pro FMX	22.4	346
Micro Express MicroFlex-K6-2/Pro (AMD K6-2/350)	18.5	N/A
Micron Millennia 450 MAX	24.0	499
MidWest Micro Multimedia Pro 450	21.5	N/A
NEC Direction SP E450	24.7	451
NETIS Professional BestBuy (PII/400)	22.4	227
nextPC N7-K62-350 (AMD K6-2/350)	18.2	222
NexTrend NexStar-400PCP	21.1	173
Polywell Poly 8450BU (PII/450)	24.4	319
Premio Apollo BX400	22.1	353
ProGen Discover MPEGII PII450	23.9	392
Quantex QP6/450 SM-4x SE	23.3	321
Racer Talladega 400	20.8	240
Royal Exciting Professional (PII/450)	21.7	138
SAG STA Dual Power Station (PII/400)	21.9	N/A
Sys Performance Pro 450BADD-R1	24.4	477
Tagram Thunderbolt H2750 (PII/450)	23.8	374
Tangent Medallion 450X	23.8	501
TigerDirect Tiger K-Series 333 3D Plus (AMD K6-2/333)	17.6	N/A
Total Peripherals Serengeti 400	22.0	358
Unicent Extreme Z300 3D (AMD K6-2/300)	17.1	274
Unitex Tailwind UT-PII400	22.0	N/A
XI 400 MTower GSP	21.5	357
Zenon Dream Media Pro (PII/450)	23.7	374

BETTER ►

BETTER ►

MHz PC with a monitor for as little as \$1,895 (the Maximus). It will suffice for standard office work, but it suffers from handicaps that enthusiasts and graphic artists will bemoan.

Six makers offered PCs based on the AMD K6-2 CPU (300- to 350-MHz models), which had processor test scores about 25 percent lower than the Pentium II systems. They weren't true bargains, except for the Micro Express, in that they were priced within \$350 of the least expensive 450-MHz Pentium II. (The next-lowest-priced K6-2, the Kingdom Pinnacle, came in at \$1,547, compared with the \$1,895 Maximus.) In fact, one K6-2/350, the \$2,899 nextPC N7-K62-350, proved both more expensive and slower than the average Pentium II.

If you're serious about multimedia, gaming, or graphics, you won't want any of the bargain PCs, no matter which CPU they have. The bargain units' on-screen

performance proved discouragingly slow; it came to about half that of the average-priced units.

The PCs from Aberdeen (\$4,495) and Polywell (\$4,395) were mostly exercises in showing how each company can custom-build the most grandiose PC. Neither performed significantly better than its mainstream kin, despite expensive options that included 10,000-rpm hard disks.

SERVICING AND UPGRADING

When it comes to serviceability, the big players score points with cases that allow tool-free access (though the latches and tight fit made opening the NEC troublesome), as did only three smaller vendors, MidWest Micro, NETiS, and NexTrend. The Compaq Deskpro stood out with a rotatable, tool-free drive bay that lets you shift from tower to desktop.

Three smaller vendors allow you to slide the motherboards out of their other-

wise conventional cases, but two of these systems (the Mega and the Zenon) arrived so warped that expansion boards couldn't be screwed in; only the ACT Brillianta avoided the bends.

The big makers slack off when it comes to upgradability, however. Should you need extensive expansion, look to Aberdeen, Polywell, and SAG—all in unusually large and commodious towers.

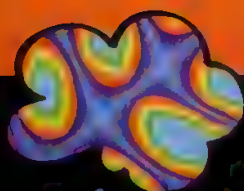
If you plan to install old ISA boards in your new PC, be wary of the CompUSA, Hertz, NETiS, NextPC, ProGen, Racer, and Unitek PCs: All lacked free IRQs. Although PCI expansion doesn't demand extra IRQs, it does require empty slots, which we didn't find in the NexTrend. Most units had USB ports, but Kingdom chose a mini-XT design that lacked them.

WHEN IN NEED

The big makers have an edge in support; with large staffs, they can delegate insom-

2D Business Graphics WinMark 99 ▲		2D Business Disk WinMark 99 (thousands of bytes/sec) ▲		2D CPUmark 99 ▲		2D CD-ROM WinMark 99 (thousands of bytes/sec) ▲		CD-ROM Transfer Rate Inside (thousands of bytes/sec) ▲		Access Time (ms) ▼		CPU Utilization (percent) ▼		Full Screen Scaling (frames per second) ▲		CPU Utilization (percent) ▼	
Model	Score	Model	Score	Model	Score	Model	Score	Model	Score	Model	Score	Model	Score	Model	Score	Model	Score
136	4,000	1,040	845	1,430	121	3	74.2	0	27								
136	2,860	1,020	857	1,450	121	5	74.2	0	27								
31	1,240	1,030	1,120	1,480	121	3	74.2	0	27								
135	2,900	1,030	1,270	2,280	84	3	74.8	0	28								
105	1,620	1,090	1,390	2,340	91	3	74.3	0	27								
85	1,890	1,090	765	1,480	142	4	1.2	432	96								
73	2,080	1,040	1,210	2,280	81	3	74.2	0	27								
105	2,810	1,080	1,300	2,300	101	4	50.0	0	26								
113	1,480	1,040	825	1,410	124	3	74.5	0	26								
105	2,880	1,090	1,090	2,300	166	3	83.9	0	26								
113	1,250	1,110	1,000	1,840	102	3	74.2	0	27								
90	2,590	1,020	948	1,450	108	3	83.8	0	27								
135	2,970	1,090	744	1,490	130	32	75.8	0	30								
98	2,880	997	1,040	2,270	95	3	13.8	263	98								
77	1,480	773	788	1,480	157	35	85.5	1	18								
144	2,970	1,090	915	1,450	130	3	74.7	0	24								
157	1,410	1,040	908	1,480	130	3	74.5	0	25								
66	2,940	878	1,310	2,200	96	3	27.8	41	98								
179	1,230	1,110	1,210	2,300	87	3	50.0	0	31								
87	2,960	1,120	1,360	2,280	100	3	127.0	1	28								
174	1,710	1,110	774	1,450	144	3	75.2	0	28								
111	2,820	1,020	887	1,440	148	3	75.9	171	97								
84	1,030	784	1,230	1,430	123	21	88.0	0	43								
99	2,940	995	1,570	1,680	114	4	50.0	0	32								
100	1,620	1,120	1,510	2,280	87	1	74.5	0	25								
138	2,880	1,040	879	1,791	119	8	59.7	0	27								
124	1,330	1,110	1,410	1,570	91	1	74.7	0	26								
141	1,690	1,060	1,310	1,903	105	7	84.9	0	26								
80	1,780	1,020	784	1,490	103	3	74.7	0	26								
92	3,030	1,120	1,230	1,800	93	3	84.3	0	25								
124	1,600	1,090	813	1,440	134	3	74.7	0	26								
147	1,580	1,110	1,030	2,820	103	3	74.7	0	24								
146	1,970	1,100	1,310	2,310	87	3	74.8	0	24								
172	2,980	1,120	1,030	1,680	102	3	80.5	9	43								
86	1,480	775	1,210	2,280	98	28	74.8	0	26								
140	2,630	984	1,370	2,310	88	3	84.5	0	28								
81	1,630	789	874	1,410	130	35	77.3	0	18								
98	2,940	1,020	1,340	2,290	85	3	36.8	0	85								
136	1,890	1,030	1,080	1,800	94	3	84.7	0	28								
145	3,490	1,090	1,060	1,650	106	6	84.7	0	25								

SHOULD I GET
A
BLACK AND WHITE
OR A
COLOR PRINTER?

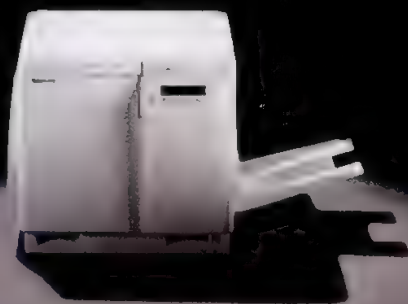


www.coloratwork.com

Presenting the \$1,495* Tektronix Phaser® 740L, the first color-upgradable laser printer. Can one printer really go from producing crisp 1200dpi black and white documents to vibrant, full-color output? Yes. And all it takes is sliding in a few color cartridges? Yes.

Tektronix

(YES.)



So why settle for a limited black and white printer when you can get a color-capable one? When you're ready to say yes to color at work, this is the printer for you.

For a very positive response to your color printer questions, call 1-800-835-6100 ext. 5-1565, or visit us at www.coloratwork.com

*Estimated U.S. selling price; smaller price may vary. © 1998 Tektronix, Inc. Tektronix and Phaser are registered trademarks of Tektronix, Inc.

PCs
Professional PCs

niacs to sit by the phone 24 hours, 7 days. Only a select few smaller makers promise a similar level of support: NextPC, NextTrend, Quantex, Tagram, Unicent, and Xi. Polywell and Sys promise round-the-clock help only for your first year of ownership. Other smaller makers limit support to business hours. A few charge for technical support, but nearly all have toll-free numbers. (See our special pull-out section "Rating PC Companies" for detailed information on vendor service offerings.)

Several vendors give you a year of free on-site service, including CompUSA, Gateway, NEC, NextTrend, Premio, Pro-

Gen, Tangent, and Xi. Typically, that service is available on the next business day, but in some cases you may have to wait two days or more. Fast-turnaround depot service may end up being more convenient.

Standard warranties are also diverse, and they're where the big makers are least aggressive. Only two major vendors (Gateway and NEC) offer three years on both parts and labor, which you also get from Axis and nextPC. The longest warranties come from the smaller companies: three years on most parts and lifetime labor from Racer; six years on labor from Reason, five years from Polywell;

and four years on both parts and labor from Micro Express.

SPEEDWAY

The majority of these PCs will race through typical business work. Almost half (17 out of 40) scored within 10 percent of the leader on our Business Winstone 99 tests. In other words, you should find their performance on typical business applications indistinguishable. All five of the largest computer makers scored in this group, and if you care to slice hairs you'll find the fastest unit came from NEC.

When you shift to watching or produc-

SUMMARY OF FEATURES

Professional PCs

	Aberdeen Inverness D50	ACT Brilliant PGII-400PE	American Multisystems InfoGold P11400	Axis Orion 100X DVD 400	Compaq DeskPro EP	CompUSA PC American Pro AP450L-SE	CyberMax Home Theater	Dell Dimension XPS R450
■ YES ■ NO								
Price of tested configuration	\$4,495 direct	\$2,298 direct	\$3,195 direct	\$2,395 direct	\$2,640 street	\$2,699.95 direct	\$2,099 direct	\$2,649 direct
Processor	Pentium II/400	Pentium II/400	Pentium II/400	Pentium II/400	Pentium II/450	Pentium II/450	AMD K6-2/350	Pentium II/450
Installed/maximum SDRAM	128MB / 2GB	128MB / 384MB	128MB / 1GB	128MB / 384MB	128MB / 384MB	128MB / 384MB	128MB / 256MB	128MB / 384MB
Installed L2 pipelined-burst cache	512K	512K	512K	512K	512K	512K	512K	512K
Motherboard manufacturer	Supermicro	Asus	Asus	Asus	Compaq	BCM	Biostar	Dell/Intel
Chip set	Intel 440 GX	Intel 440 BX	Intel 440 BX	Intel 440 BX	Intel 440 BX	Intel 440 BX	ALI Aladdin V	Intel 440 BX
Hard disk	17.4GB Seagate ST118202LW	9.5GB IBM DTTA-371010	17.4GB Seagate ST118273W	9.6GB IBM DTTA-371010	13.8GB IBM DTTA-371440	12.4GB Fujitsu MPB3064AT	13.8GB IBM DTTA-371440	9.6GB IBM DTTA-371010
Extra mass storage	SyQuest SparQ 1.0	Mitsubishi LS-120	Imega Jaz 1GB	Imega Zip 100	Imega Zip 100	Imega Zip 100	Imega Zip 100	Imega Zip 100

Multimedia and Communications

Graphics adapter	Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	ATI Xpert 98 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	STB Velocity 4400 AGP (16MB SDRAM)	Real 3D Starfighter AGP (8MB SGRAM)	STB Velocity 128 AGP (4MB SGRAM)	STB Velocity 4400 AGP (16MB SDRAM)
Graphics chip set	Matrox MGA-G200	Matrox MGA-G200	ATI 3D Rage Pro Turbo	Matrox MGA-G200	nVidia RIVA TNT	Intel i740	nVidia RIVA 128	nVidia RIVA TNT
MPEG-2 support	Creative Labs Dxr2	Creative Labs Dxr2	ATI Xpert 98	Cyberlink Power DVD	None	None	None	CineMaster C WDM DVD
Monitor (claimed/measured diagonal size, in inches)	ViewSonic VCDTS21411 (21 / 19.8)	CyberVision C70 (17 / 16.1)	ArtMedia Trinitron A-700T (17 / 15.8)	CTX VL950 (19 / 18.2)	Compaq V75 (17 / 16.0)	Royal X-19 (19 / 17.5)	CyberMax AT1097 (19 / 17.8)	Dell Trinitron 1000HS (17 / 16.0)
CD-ROM or DVD-ROM drive	2X Creative Labs DVD Encore	2X Creative Labs DVD Encore	2X Toshiba SD-M1102 DVD	4.8X Toshiba SD-M1202 DVD	32X Compaq CRD-83208	2X Hitachi GD-2000 DVD	32X Toshiba XM-6202B	4.8X Toshiba SD-M1202 DVD
PCI sound device	Creative Labs Sound Blaster PCI128	DCS S805	Ensoniq ES1370	Creative Labs Sound Blaster PCI128	Ensoniq ES1371	AzTech 1338-A3D	Ensoniq AudioPCI	Turtle Beach Montego II
Audio synthesis	Wavetable	Wavetable	Wavetable	Wavetable	Wavetable	FM, wavetable	Wavetable	Wavetable
Speakers	Cambridge Soundworks/Microworks	EMCom AM105A	Yamaha YST-M15	Altec Lansing ADA305	Altec Lansing ACS48	Altec Lansing ACS45	Altec Lansing ACS490	Altec Lansing ACS295
Network adapter	None	10/100-Mbps PCI	None	None	None	None	None	None
V.90 upgradable (56K standard)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)

Expandability

Expansion-bus slots	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 4 PCI, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP
Front-accessible drive bays (5.25" / 3.5")	6/1	3/2	3/2	3/2	3/1	2/3	4/1	2/3
Internal drive bays (5.25" / 3.5")	0/3	0/2	0/1	0/1	0/2	0/2	0/4	0/2
Parallel/serial/USB ports	1/2/5	1/2/2	1/2/2	1/2/2	1/2/2	1/2/2	1/2/2	1/1/2
Power-supply wattage	300	235	235	235	145	235	235	200

Service and Support

24-hour, 7-day technical support	■	■	■	■	■	■	■	■
Standard warranty on parts/labor	1 year/1 year	1 year/1 year	1 year/2 years	3 years/3 years	3 years/1 year	3 years/1 year	3 years/1 year	3 years/1 year
On-site service charge for 1 year	N/A	\$99	N/A	Included	Included	Included	Included	Included

N/A—Not applicable. The product does not have this feature. * San Diego area only.

ing multimedia, editing graphics, or creating art, you'll have to be more selective. Although CPU scores were tightly clustered within two groups, the Pentium IIs and the K6-2s, the Business Graphics WinMark 99 scores covered almost a 3-to-1 range, from 66 (Micro Express) to 175 (Micron, with the NEC close behind at 174). That is a difference anyone will be able to see.

You'll see similar differences on 3-D functions. Only five machines scored within 10 percent of the Compaq (the leader on our 3D WinMark tests): the other major players (Dell, Gateway, Micron,

and NEC) and Sys. Top graphics performers used nVidia RIVA TNT-based subsystems, closely followed by those using Matrox G200-based graphics.

Aberdeen souped up its already expensive PC with a 10,000-rpm Ultra Wide SCSI-2 disk (a \$1,200 option), beating all comers on disk tests but scoring about average on application-oriented tests. Polywell, second in the disk speed race, also supplied a 10,000-rpm drive; the computer tested almost indistinguishably from the best units with 7,200-rpm drives (from Compaq, NEC, and Quantex). The most exotic disk subsystem, the two-drive

RAID 0 array in the Sys, yielded slower results than the more mundane 7,200-rpm trio was able to achieve.

In playing video, all the PCs equipped with DVD drives produced watchable full-screen images, although hardware-based MPEG decoders were subtly smoother than the software-based systems despite 450-MHz processing power.

Two vendors, Aberdeen and Mega, sent in systems with overclocked processors. We reset the systems for testing. For more detailed information, see Trends/Inside PC Labs in our previous issue (November 17, 1998).

See www.pcmag.com for interactive views

Continues

PC MAGAZINE
EDITOR'S CHOICE

DMI Thunder II	DTK APRIL-80M/P450	Gateway G6-450	Hertz PII 400	HIQ Impact 2000	Initiative ITI-PCE400	Kingdom Pinnacle K6-II 3D 300	Maximus PowerMax DVD P450XP	Mega Impact PII400 120 Pro FMX	Micro Express MicroFlex-K6-2/Pro
\$2,670 street	\$2,690 street	\$2,632 direct	\$2,495 direct	\$2,399 direct	\$1,993 direct	\$1,547 direct	\$1,895 direct	\$1,995 direct	\$1,299 direct
Pentium II/400	Pentium II/450	Pentium II/450	Pentium II/400	Pentium II/400	Pentium II/400	AMD K6-2/300	Pentium II/450	Pentium II/400	AMD K6-2/350
128MB / 384MB	128MB / 1GB	128MB / 384MB	128MB / 384MB	128MB / 384MB	128MB / 768MB	128MB / 512MB	128MB / 384MB	128MB / 512MB	128MB / 384MB
512K	512K	512K	512K	512K	512K	512K	512K	512K	1MB
Epos	DTK	Intel	Intel	Asus	Tyan	ECS	BCM	Supermicro	Micro Express
Intel 440 BX	Intel 440 BX	Intel 440 BX	Intel 440 BX	Intel 440 BX	Intel 440 BX	SIS 558†	Intel 440 BX	Intel 440 BX	VIA Apollo MVP3
12.4GB IBM	9.6GB IBM	9.6GB IBM	9.9GB Quantum	13.8GB IBM	9.6GB IBM	11GB Maxtor	9.6GB IBM	12.4GB IBM	9.5GB Maxtor
DTTA-351290	DTTA-371010	DTTA-371010	Fireball EL10.2A	DTTA-371440	DTTA-371010	915208	DTTA-371010	DTTA-351290	9100D8
None	Mitsubishi LS-120	Philips 3810 CD-RW	None	SyQuest SyJet 1.5	Imega Zip 100	Mitsubishi LS-120	None	Mitsubishi LS-120	None
Matrox Millennium II AGP (8MB SGRAM)	Matrox Mystique G200 AGP (8MB SGRAM)	STB Velocity 4400 AGP (16MB SDRAM)	ATI 3D Rage Pro AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Productiva AGP (8MB SGRAM)	ATI 3D Rage Pro AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	STB Velocity 128 AGP (8MB SGRAM)
Matrox MGA-2164W	Matrox MGA-G200	nVidia RIVA TNT	ATI Mach64	Matrox MGA-G200	Matrox MGA-G100	ATI Mach64	Matrox MGA-G200	Matrox MGA-G200	nVidia RIVA 128
None	Zoran SoftDVD 2.0	Quadrant	Creative Labs Dxr2	None	None	Creative Labs Dxr2	Zoran SoftDVD 2.0	None	None
Princeton E076 (17 / 15.8)	ADI MicroScan SP (17 / 15.6)	Gateway VX900 (19 / 17.9)	Sampo KM761 (17 / 15.8)	Panasonic E70 (17 / 16.0)	OptiQuest 071 (17 / 15.9)	Kingdom 70i (17 / 15.8)	Futura L7031LD (17 / 16.1)	iiyama S7016T (17 / 15.6)	Impression J71A (17 / 15.5)
2X Creative Labs DVD Encore	4.8X Toshiba SD-M1202 DVD	2X Toshiba SD-M1102 DVD	2X Creative Labs DVD Encore	2X Creative Labs DVD Encore	32X Mitsumi FX320S	2X Creative Labs DVD Encore	2X Hitachi GD-2000 DVD	2X Hitachi GD-2000 DVD	32X Sony CDU711
Ensoniq AudioPCI	Creative Labs Sound Blaster AWE64D	Integrated Creative Labs Sound Blaster PCI128	Integrated Crystal Audio CS4611	SiIG-2	Creative Labs Sound Blaster AWE64	Ensoniq AudioPCI	Trident	Ensoniq AudioPCI	Creative Labs Sound Blaster PCI128
Wavetable	Wavetable	Wavetable	FM, wavetable	FM, wavetable	FM, wavetable	Wavetable	FM	Wavetable	Wavetable
Altec Lansing ACS48	Boss 3000	Boston Acoustics BA635	Labtec LCS-1022	Justar 30-101	Altec Lansing ACS52	Altec Lansing ACS43N	Wave WV800	KingTex EP-280	Altec Lansing ACS44
None	None	None	None	None	None	None	None	10/100-Mbps PCI	None
■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (x2)	■ (K56flex)
2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP
3/2	4/2	3/2	4/2	3/2	3/2	3/2	3/1	3/2	3/2
0/1	0/1	0/3	0/1	0/1	0/1	0/3	0/2	0/1	0/1
1/2/2	1/2/2	1/2/2	1/2/2	1/2/2	1/2/2	1/2/0	1/2/2	1/2/2	1/2/2
250	300	200	250	235	275	235	230	250	300
■	■	■	■	■	■	■	■	■	■
3 years/1 year	2 years/2 years	3 years/3 years	1 year/1 year	3 years/1 year	1 year/1 year	1-5 years/1 year	3 years/1 year	2 years/2 years	4 years/4 years
N/A	\$50	Included	N/A	\$35	Included	Included	N/A	\$50*	\$50



Estimated authorized IBM Reseller Price for model 3026-20U. Actual prices may vary. MHz denotes microprocessor internal clock speed only, other factors may also affect application performance. GB=1 billion bytes when referring to HDD capacity. PCs referenced in this ad include an operating system. IBM product names are trademarks of International Business Machines Corporation. Intel Inside and Pentium are registered trademarks of Intel Corporation. © 1998 IBM Corp. All rights reserved.

RULES? WHAT RULES.



INTRODUCING THE IBM THINKPAD® 390 SERIES

Who said notebook computers were just for the big budget guys? The ThinkPad 390 gives small business professionals a fully integrated desktop alternative at a small business price. It's got a huge active matrix screen, a built-in CD-ROM and floppy drive, high-performance stereo speakers, and a keyboard so roomy you forget it's a notebook. All the power you need. All at a price you can handle. See the full line of ThinkPads at www.ibm.com/thinkpad or call 1 800 426 7255, ext. 5020.

 e-business tools

Intel® processors (up to 266 MHz) / Up to 4.3GB hard drive / 12.1" or 14.1" screen / CD-ROM / From \$1,799

IBM



BEST PICK

If this story teaches any lesson, it's that the big kids are keeping the competition keen. Picking the best among them proved a challenge. The Gateway PC, our Editors' Choice, didn't ace its competitors on any one test, but it hung among the top runners on them all. We were won over by its total value—with features galore, including both CD-RW and DVD drives (though we'd like to see a 4.8X DVD), Boston Acoustics speakers, and serviceability and support among the best. Although the Micron costs a bit more, it offers more disk space and ties with Dell for the runner-up spot.

Certainly you'll still find some good deals among the machines from smaller vendors. But these PCs show that besides a familiar name, the big makers now give you something more: big value.

Aberdeen Inverness D50

Pentium II/400, 17.4GB disk, 21-inch monitor, ECC SDRAM. Winstone 99: 22.2. \$4,495 direct. Santa Fe Springs, CA; 888-300-5545, 562-699-6998; www.aberdeeninc.com; 500 at www.pcmag.com/infolink.

• For the Aberdeen Inverness D50's above-average price, you do get correspondingly more hardware, including a large disk, a 21-inch monitor with a four-port USB hub in the base, and a SyQuest SparQ 1GB cartridge

drive. The unit arrived with an overclocked processor, however—a dangerous practice (we corrected the CPU speed for testing). The system earned a top test score only for its 17.4GB Ultra Wide SCSI-2 hard disk; other results were average. The tall tower provides expansion galore, but the warranty period is short—just one year.—Winn L. Rosch

All Computer Technology Brillianta P6II-400PE

Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM. Winstone 99: 22.5. \$2,298 direct. City of Industry, CA; 800-775-1953, 626-369-4181; www.allcomp.com; 503 at www.pcmag.com/infolink.

• Priced competitively, the ACT Brillianta P6II-

SUMMARY OF FEATURES

Professional PCs

	Micron Millennia 450 MAX	MidWest Micro Multimedia Pro 450	NEC Direction SP E450	NETIS Professional BestBuy	nextPC N7-K62-350	NexTrend NexStar- 400PCP	Polywell Poly 8450BU	Premio Apollo 8X400
■ YES ■ NO								
Price of tested configuration	\$2,899 direct	\$2,699 direct	\$3,188 direct	\$2,276 direct	\$2,899 direct	\$3,679 direct	\$4,395 direct	\$4,100 street
Processor	Pentium II/450	Pentium II/450	Pentium II/450	Pentium II/400	AMD K8-2/350	Pentium II/400	Pentium II/450	Pentium II/400
Installed/maximum SDRAM	128MB / 384MB	128MB / 384MB	128MB / 384MB	128MB / 384MB	128MB / 384MB	128MB / 384MB	128MB / 1GB	128MB / 512MB
Installed L2 pipelined-burst cache	512K	512K	512K	512K	512K	512K	512K	512K
Motherboard manufacturer	Intel	Asus	Intel	Intel	Micro-Star	Micro-Star	Asus	Micro-Star
Chip set	Intel 440 BX	Intel 440 BX	Intel 440 BX	Intel 440 BX	AU Aladdin V	Intel 440 BX	Intel 440 BX	Intel 440 BX
Hard disk	13.8GB IBM DTTA-371440	13.8GB IBM DTTA-371440	13.8GB IBM DTTA-371440	11GB Maxtor 9115208	13.8GB IBM DTTA-371440	13.8GB IBM DTTA-371440	17.4GB Seagate ST118202LV	17.4GB Quantum Atlas III
Extra mass storage	Imega Zip 100	Mitsubishi LS-120	Imega Zip 100	None	SyQuest SparQ 1.0	Seagate Tapestor 8GB	Panasonic PD-2 DVD-RAM	Imega Zip 100

Multimedia and Communications

Graphics adapter	Diamond Viper V550 AGP (16MB SDRAM)	STB Velocity 128 AGP (8MB SGRAM)	Diamond Viper V550 AGP (16MB SDRAM)	Diamond Stealth II G460 AGP (8MB SDRAM)	Diamond Stealth II G460 AGP (8MB SDRAM)	STB Velocity 128 AGP (8MB SGRAM)	Matrox Millenni- um G200 AGP (8MB SGRAM)	Matrox Millenni- um G200 AGP (8MB SGRAM)
Graphics chip set	nVidia RIVA TNT	nVidia RIVA 128	nVidia RIVA TNT	Intel i740	Intel i740	nVidia RIVA 128	Matrox MGA-G200	Matrox MGA-G200
MPEG-2 support	Zoran SoftDVD 2.0	E4 Cool DVD	Zoran SoftDVD 2.0	Sigma Design REALmagic Hollywood	Creative Labs Dxr2	Sigma Design REALmagic	Sigma Design REALmagic Hollywood Plus	None
Monitor (claimed/measured diagonal size, in inches)	Micron 900BX (19 / 17.8)	Clearmax CM- 1726 (17 / 15.8)	NEC C900 (19 / 17.5)	Sampo KM711 (17 / 15.5)	CyberVision C32 (19 / 18.0)	CyberVision C112 (21 / 19.5)	Sampo KM-810 (19 / 17.9)	MAG DJ 920 (21 / 20.0)
CD-ROM or DVD-ROM drive	4.8X Toshiba SD-M1202 DVD	4.8X Toshiba SD-M1202 DVD	2X Hitachi DD-2000 DVD	2X Philips DRD 5200/10 DVD	2X Creative Labs DVD Encore	2X Toshiba XM-M1102 DVD	32X Toshiba XM-6202B	2X Creative Labs DVD Encore
PCI sound device	Creative Labs Sound Blaster PCI128	Creative Labs Sound Blaster AWE64D	Integrated Crystal CS4611-LM	Yamaha Harmony 3ds724e	Creative Labs Sound Blaster PCI128	Creative Labs Sound Blaster PCI128	AzTech PCI 338-A 3D	Ensoniq ES1370
Audio synthesis	Wavetable	Wavetable	Wavetable	FM	Wavetable	Wavetable	FM	Wavetable
Speakers	Monsoon MM-1000	Altec Lansing ADA305	Altec Lansing ACS45	KingTex EP-280	Altec Lansing ADA305	Altec Lansing ADA305	Altec Lansing ACS45	Premio HiFi Sound
Network adapter	None	None	None	None	10/100-Mbps PCI	10/100-Mbps PCI	None	None
V.90 upgradable (56K standard)	■ (K2)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)

Expandability

Expansion-bus slots	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP
Front-accessible drive bays (5.25" / 3.5")	2 / 3	3 / 2	2 / 3	3 / 2	3 / 2	3 / 2	6 / 2	3 / 2
Internal drive bays (5.25" / 3.5")	0 / 2	0 / 2	0 / 1	0 / 2	0 / 1	0 / 1	0 / 1	0 / 2
Parallel/serial/USB ports	1 / 2 / 2	1 / 2 / 2	2 / 2 / 2	2 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2
Power-supply wattage	235	200	235	235	230	230	300	200

Service and Support

24-hour, 7-day technical support	■	■	■	■	■	■	■	■
Standard warranty on parts/labor	3-5 years/3 years	3-5 years/3 years	3 years/3 years	1 year/1 year	3 years/3 years	3 years/3 years	3 years/5 years	3 years/1 year
On-site service charge for 1 year	Included	Included	Included	\$75	Included	Included	\$75	Included

400PE comes with compelling components and service options, as well as Microsoft Office 97 Professional and a network adapter—a plus for businesses and home users interested in networking their PCs. The squat minitower case houses a motherboard that slides out for easy component access. The system was an average performer, and its DVD playback was good; it comes with a special manual containing all warranties and contact numbers. —*Frank J. Evans*

American Multisystems InfoGold PII400

Pentium II/400, 17.4GB disk, 17-inch monitor, SDRAM. Winstone 99: 20.9. \$3,195 direct. Milpitas, CA; 800-888-

6615, 408-945-2296; www.infogold.com; 504 at www.pcmag.com/infolink.

• The American Multisystems PC offers business users lots of storage and plenty of expandability, including a 1GB Iomega Jaz Drive and two free IRQs. An integrated Ethernet connector facilitates networking. The unit's ATI video card is a solid choice for mainstream graphics but falters under 3-D tasks. Technical support is available only during business hours. —*Richard Brown*

Axis Orion 100X DVD 400

Pentium II/400, 9.6GB disk, 19-inch monitor, SDRAM. Winstone 99: 22.6. \$2,395 direct. Anaheim, CA; 800-378-9014, 714-782-1787; www.axisys.com; 505 at www.pcmag.com/infolink.

• The Axis Orion PC is a very flexible, well-priced system with a good warranty. The Orion's extras are fairly enticing as well, including Altec Lansing USB speakers that blast True Digital Audio. Performance was mostly average. The unit doesn't include any documentation beyond the component manuals, so first-time users may be better off with another system. —*RB*

Compaq Deskpro EP

Pentium II/450, 13.8GB disk, 17-inch monitor, SDRAM; Winstone 99: 23.8. \$2,640 street. Houston; 800-345-1518, 281-370-0670; www.compaq.com.



• Well suited to small or medium-size businesses, this Deskpro does cut a few corners, giving you a single internal speaker for sound, a 32X CD-ROM drive rather than DVD, and a tiny 145-watt power supply. Unless you intend to do heavy multimedia work, however, you won't miss having more sophisticated features. And you'll find no compromises in performance: All the scores were near the top. Compaq provides round-the-clock tech support, and the unit comes with some management features. Compaq will soon be launching a new line of systems focused on small and medium-size business needs. —*WLR*

CompUSA PC American Pro AP450L-SE

Pentium II/450, 12.4GB disk, 19-inch monitor, SDRAM; Winstone 99: 20.8. \$2,699.95 direct. Dallas; 888-266-6772, 508-480-8500; www.compUSA.com; 507 at www.pcmag.com/infolink.

• Although acceptable, the CompUSA PC American Pro AP450L-SE's test scores were some of the lowest among the Pentium II/450-based PCs we tested, and the unit has no free IRQs. However, novice to intermediate-level professional users may like having extras such as the Iomega Zip Drive and the bundled copy of Microsoft Office 97 Small Business Edition. The system comes with one year of on-site service and round-the-clock technical support. —*Raymond M. Padilla*

CyberMax Home Theater

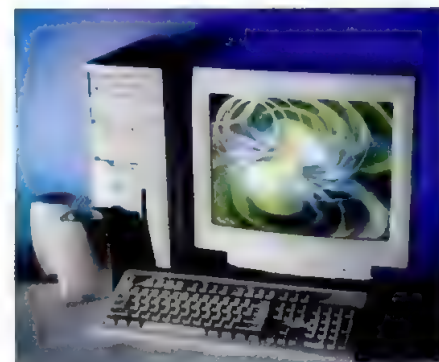
AMD K6-2/333, 13.8GB disk, 19-inch monitor, SDRAM; Winstone 99: 17.1. \$2,099 direct. Allentown, PA; 800-443-9868, 610-770-1808; www.cybermax.com; 508 at www.pcmag.com/infolink.

• A large monitor, good software (which includes Corel WordPerfect Suite 8 and several good reference titles), and an Iomega Zip Drive recommend the Home Theater, but it is overpriced given the rest of its components and its below-average performance. Bargain hunters can find better deals, and high-end users will want more power. —*FJE*

Dell Dimension XPS R450

Pentium II/450, 9.6GB disk, 17-inch monitor, SDRAM; Winstone 99: 23.2. \$2,649 direct. Round Rock, TX; 800-915-3355, 512-338-4400; www.dell.com; 509 at www.pcmag.com/infolink.

• The Dell Dimension XPS R450 is aimed at power users and the small-business market, but gamers, take note: The system has a top 3-D accelerator card that really shines on 3-D games; its high 3-D test score also bears this out. Sound is great, too: The Turtle Beach Montego II card handles more sounds in hardware than most cards, allowing faster processing. This unit has a tool-free case, and it comes with Microsoft Office 97 Small Business Edition and top service. —*FJE*



Continues

ProGen Discover MPEGI PII450	Quantex QP6/450 SM-4x SE	Racer Talladega 400
\$2,149 direct	\$2,578 direct	\$2,199 direct
Pentium II/450	Pentium II/450	Pentium II/400
128MB / 768MB	128MB / 384MB	128MB / 384MB
512K	512K	512K
Asus	Micro-Star	Intel
Intel 440 BX	Intel 440 BX	Intel 440 BX
9.5GB Maxtor 91000D8	13.8GB IBM DTTA-371440	11GB Maxtor 91152D8
Iomega Zip 100	Iomega Zip 100	None
Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Real 3D Starfighter AGP (8MB SGRAM)
Matrox MGA-G200	Matrox MGA-G200	Intel i740
Sigma Design REALmagic Hollywood Plus	Zoran SoftDVD 2.0	Zoran SoftDVD 2.0
CyberVision C92 (19 / 18.0)	Quantex AT 1097F (19 / 17.5)	MaxTech XT-7861 (17 / 15.9)
4.8X Toshiba SD-M1202 DVD	4.8X Toshiba SD-M1202 DVD	2X Hitachi GD-2000 DVD
Aureal Vortex 8820	Ensoniq ES1371	Integrated Crystal CS4611
Wavetable	Wavetable	Wavetable
Mli 818 Super	Altec Lansing ACS-490	Altec Lansing ACS48
None	None	None
■ (K56flex)	■ (K56flex)	■ (K56flex)
2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP
3 / 2	4 / 1	3 / 2
0 / 2	0 / 3	0 / 3
1 / 2 / 2	1 / 2 / 2	1 / 2 / 2
235	235	235
3 years/1 year Included	3 years/1 year Included	3 years/lifetime Included



**The ideal Mini DV
for multimedia.**

- Normal Movie,
Photo (Still) or
Digital Motor Drive
(30 stills per second)
- Progressive Scan CCD
with RGB filter
- 14x Optical/35x Digital
zoom with Optical
Image Stabilization
- Select EOS Flash
compatibility

optura

There's no such thing as a digital camcorder for So we made digital

Each one has an IEEE 1394 digital terminal for computer connectivity,
get from Canon lenses, and offers the superior digital video and audio



**The ultra compact
Mini DV is our smallest,
most portable ever.**

- 11x Optical/44x Digital
zoom with Image
stabilization
- 2.5" LCD viewscreen
- Detachable viewfinder
- Digital Stereo Sound

ZR





**Our most versatile
Mini DV yet.**

- 16x Optical/64x Digital zoom with Optical Image Stabilization
- 2.8" LCD viewscreen
- Exclusive Built-in Video Editor
- Select EOS Flash compatibility
- "Clear Still" technology

VISTARA

everybody.
camcorders for everybody.

shoots stills as well as video, gives you picture clarity you can only
quality of a Mini DV digital camcorder. And yet, each one is different.



**The ultimate
Mini DV camcorder.**

- Exclusive XL Mount interchangeable lens system
- 3CCD with exceptional low light performance
- 16x SuperRange Optical Image Stabilizer lens standard
- Extra Wide-Angle 3x zoom lens optional
- Manual control

XL1

Canon

www.canondv.com

DMI Thunder II

Pentium II/400, 12.4GB disk, 17-inch monitor, SDRAM; Winstone 99: 20.9. \$2,670 street. Solon, OH; 800-275-5700, 440-349-0444; www.dmi-computer.com; 510 at www.pcmag.com/infolink.

• The DMI Thunder II is a well-made but undistinguished system at a price that will get you more elsewhere. Expansion is limited by the one free PCI slot. Performance gets hobbled by the slow-spinning (5,400-rpm) hard disk, and the hardware-based DVD video overlay bleeds through foreground windows. DMI offers a limited three-year warranty and business-hours technical support.—WLR

DTK APRI-80M/P450

Pentium II/450, 9.6GB disk, 17-inch monitor, SDRAM; Winstone 99: 23.0. \$2,690 street. City of Industry, CA; 800-289-2385, 626-810-0098; www.dtkcomputer.com; 511 at www.pcmag.com/infolink.

• The DTK APRI-80M/P450 boasts good performance, but the system is light on documentation and provides somewhat difficult access for mounting 3.5-inch drives (5.25-inch drives use rails). Other weaknesses: a single available PCI slot, no free IRQs, an LS-120 drive that had trouble reading standard floppy disks (a standard floppy disk drive was also included), and occasionally jerky software-based MPEG decoding of DVD playback.—WLR

Gateway G6-450

Pentium II/450, 9.6GB disk, 19-inch monitor, SDRAM; Winstone 99: 23.8. \$2,632 direct. North Sioux City, SD; 800-846-2000, 605-232-2000; www.gateway.com; 513 at www.pcmag.com/infolink.



Our Editors' Choice, the Gateway G6-450, offers everything you need: top performance, strong multimedia, a tool-free case, ample expansion room, and great service. The Philips CD-RW drive is a great plus; the Boston Acoustics speakers are top-notch; and DVD playback was smooth. Gateway offers Internet service through Gateway.net and gives you a choice of soft-

SUMMARY OF FEATURES

Professional PCs

■ YES ■ NO	Royal Exciting Professional	SAG STA Dual Power Station	Sys Performance Pro 450BADD-R1	Targem Thunderbolt H2750	Tangent Medallion 450X	TigerDirect Tiger K-Series 333 3D Plus	Total Peripherals Serengeti 400	Unicent Extreme Z300 3D
Price of tested configuration	\$2,788 direct	\$2,400 direct	\$2,899 direct	\$2,199 direct	\$2,995 direct	\$1,889 direct	\$2,415 direct	\$1,699 direct
Processor	Pentium II/450	Pentium II/400	Pentium II/450	Pentium II/450	Pentium II/450	AMD K8-2/333	Pentium II/400	AMD K8-2/300
Installed/maximum SDRAM	128MB / 384MB	128MB / 512MB	128MB / 512MB	128MB / 384MB	128MB / 384MB	128MB / 384MB	128MB / 384MB	128MB / 384MB
Installed L2 pipelined-burst cache	512K	512K	512K	512K	512K	1MB	512K	512K
Motherboard manufacturer	Asus	Supermicro	Giga-Byte	GVC	Supermicro	Micro Computer	Asus	Micro-Star
Chip set	Intel 440 BX	Intel 440 BX	Intel 440 BX	Intel 440 BX	Intel 440 BX	VI Apollo MVP3	Intel 440 BX	ALI M1531
Hard disk	13.8GB IBM DTTA-371440	13.8GB IBM DTTA-371440	9.6GB IBM DTTA-371010	13.8GB IBM DTTA-371440	13.8GB IBM DTTA-371440	16.8GB IBM DTTA-351690	9.9GB Quantum Fireball EL10.2A	9.6GB Maxtor 9100807
Extra mass storage	None	Mitsubishi LS-120	None	Imega Zip 180	HP CD-Writer Plus 7200 Series	Mitsubishi LS-120	Imega Zip 100	None
Multimedia and Communications								
Graphics adapter	ATI All-in-Wonder Pro AGP (8MB SGRAM)	Number Nine Revolution IV AGP (16MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	STB Velocity 4400 AGP (16MB SDRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (16MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)
Graphics chip set	ATI Mach64	Number Nine Silverhammer	Matrox MGA-G200	Matrox MGA-G200	nVidia RIVA TNT	Matrox MGA-G200	Matrox MGA-G200	Matrox MGA-G200
MPEG-2 support	ATI DVD Player	Creative Labs Dxr2	None	Zoran SoftDVD 2.0	Xing	None	None	Zoran SoftDVD 2.0
Monitor (claimed/measured diagonal size, in inches)	OptiQuest V95 (19 / 17.8)	Hitachi CM751U-518 (19 / 17.9)	Sys SPM-17-MS (17 / 15.8)	MAG DJ 702e (17 / 15.9)	CTX VL950 (19 / 18.0)	KDS VS-19 (19 / 18.0)	Imagic 778 L (17 / 18.1)	CyberVision C82 (19 / 18.0)
CD-ROM or DVD-ROM drive	2X Pioneer DVD-A02	2X Creative Labs DVD Encore	40X Kenwood UCR004010	4.8X Toshiba SD-M1202 DVD	2X Toshiba SD-M1102 DVD	32X Mitsumi FX320S	32X Toshiba XM-6202B	2X Creative Labs DVD Encore
PCI sound device	Creative Labs Sound Blaster PCI128	Ensoniq AudioPCI	Diamond Monster Sound MX200	Ensoniq ES1370	Creative Labs Sound Blaster AWE64	Diamond Multimedia Monster Sound	Ensoniq AudioPCI	Ensoniq AudioPCI
Audio synthesis	Wavetable	Wavetable	Wavetable	Wavetable	Wavetable	Wavetable	Wavetable	Wavetable
Speakers	Altec Lansing ADA305	Benwin BWS 30-3D	Altec Lansing ADA305	Altec Lansing ACS45	Altec Lansing ACS45	JBL Pro Media Sys 2000	Wave WV290	Altec Lansing ADA305
Network adapter	None	None	None	None	None	None	None	None
V.90 upgradable (56K standard)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (K56flex)	■ (x2)	■ (K56flex)	■ (K56flex)	■ (K56flex)
Expandability								
Expansion-bus slots	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP
Front-accessible drive bays (5.25" / 3.5")	3 / 2	3 / 2	3 / 2	4 / 2	2 / 3	3 / 2	3 / 2	2 / 3
Internal drive bays (5.25" / 3.5")	0 / 1	0 / 2	0 / 3	0 / 1	0 / 3	0 / 1	0 / 1	0 / 3
Parallel/serial/USB ports	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 0	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2
Power-supply wattage	230	235	235	250	235	230	235	230
Service and Support								
24-hour, 7-day technical support	■	■	■	■	■	■	■	■
Standard warranty on parts/labor	1 year/1 year	3 years/1 year	1-5 years/5 years	3 years/1 year	3 years/3 years	1 year/1 year	3 years/1 year	3 years/1 year
On-site service charge for 1 year	\$130 (2 years)	Included	Included	\$45	Included	Included	Included	Included*

* Within 200 miles of a U.S. metropolitan area.

ware bundles, including Microsoft Office 97 Small Business Edition.—*Mary E. Behr*

Hertz PII 400

Pentium II/400, 9.9GB disk, 17-inch monitor, SDRAM. Winstone 99: 20.8. \$2,495 direct. New York; 888-222-7280, 212-634-4280; www.hertztac.com; 515 at www.pcmag.com/infolink.

• The Hertz PII 400's games software is more suitable for family users, but Hertz is aiming the PII 400 at professionals. Those needing top-notch graphics or extensive service should look elsewhere: Graphics performance was poor; the warranty is just one year; on-site service is \$395; and live technical support is a toll call during select hours. The unit's lack of

free IRQs restricts expansion.—*RMP*

HiQ Impact 2000

Pentium II/400, 13.8GB disk; 17-inch monitor, SDRAM. Winstone 99: 21.5. \$2,399 direct. Sunnyvale, CA; 800-827-5836, 408-245-5836; www.hiqcomputers.com; 519 at www.pcmag.com/infolink.

• The HiQ Impact 2000 gets excellent performance from its 400-MHz Pentium II chip, but memory upgrades are troublesome. Its three DIMM sockets are hidden behind a metal panel with a hard-edged cutout that permits only small fists to reach in—to find a finger-snarl-ing bundle of unyielding wires still in the way. On-site service is \$45 for one year.—*WLR*

Initiative Technology ITI-PCE400

Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM. Winstone 99: 20.8. \$1,993 direct. Brownwood, TX; 800-999-1413, 915-643-1845; www.initiative-tech.com; 521 at www.pcmag.com/infolink.

• The extra-wide Initiative Technology ITI-PCE400 comes up short on graphics performance, documentation, and warranty. Experienced users may want to concentrate instead on its low price, ample expansion room, and good DVD playback. Those seeking a good 3-D system should look elsewhere: Because of problematic DirectX 6.0 drivers, the unit could not complete our tests.—*WLR*

Kingdom Pinnacle K6-II 3D 300

AMD K6-2/300, 11GB disk; 17-inch monitor, SDRAM. Winstone 99: 17.3. \$1,547 direct. Mansfield, PA; 800-385-3436, 717-662-7515; www.kingdomcomputers.com; 522 at www.pcmag.com/infolink.

• Strike one: The Kingdom Pinnacle K6-II 3D 300's CPU lags behind every other PC's in this roundup. Strike two: Memory expansion is complicated. Strike three: Too many muffed details: dated documentation, unlabeled rear-panel jacks, a big but slow hard disk, and 3.5-inch drive bays that have to be removed to access screws. The \$1,547 price is not the lowball it seems. Because of problematic DirectX 6.0 drivers, the unit was also unable to run our 3D WinMark tests.—*WLR*

Maximus PowerMax DVD P450XP

Pentium II/450, 9.6GB disk; 17-inch monitor, SDRAM. Winstone 99: 23.5. \$1,895 direct. Irwindale, CA; 800-962-2888, 626-815-7777; www.maximusp.com; 523 at www.pcmag.com/infolink.

• Seeing the \$1,895 price on the PowerMax, you might suspect Maximus left something out. The slights are mostly in the intangible matters—no on-site service and limited support hours—restricting the PowerMax to experienced bargain hunters. You do have plenty of expansion room. The DVD drive, with software-decoded MPEG, provides slightly jerky performance.—*WLR*

Mega Impact PII400 128ProFMX

Pentium II/400, 12.4GB disk, 17-inch monitor, SDRAM. Winstone 99: 22.4. \$1,995 direct. San Diego; 800-338-6628, 619-487-8888; www.megacs.com; 524 at www.pcmag.com/infolink.

• The Mega PC is a good performer, but it arrived for testing with an overclocked processor, which is dangerous and voids the part's Intel warranty (we corrected the clock



speed before testing). The unit's motherboard slides out for easy servicing, but the mini-tower case warped slightly; as a result, screwing down expansion cards caused them to pop out of the slots. Mega is working on a solution. Also, the DVD software player was not installed, and one USB port was blocked. There are better PCs in this roundup.—*FJE*

Micro Express MicroFlex-K6-2/Pro

AMD K6-2/350, 9.5GB disk, 17-inch monitor, SDRAM. Winstone 99: 18.5. \$1,299 direct. Irvine, CA; 800-989-9900, 949-852-1400; www.microexpress.net; 525 at www.pcmag.com/infolink.

• At \$1,299 (direct), the MicroFlex-K6-2/Pro system is for the bargain hunter rather than the enthusiast; it does the job, but its Winstone score was 33 percent below what the roundup leaders achieved. Expansion potential is good, and components are accessible. The motherboard accepts either SIMMs or DIMMs, but using SIMMs means tossing the unit's pair of factory-equipped DIMMs. The warranty lasts four years, and after-hours technical support is available via pager.—*WLR*



Ends

Unitek Tailwind UT-PII400	Xi 400 MTower GSP	Zenon Dream Media Pro
\$2,099 direct	\$2,299 direct	\$2,199 direct
Pentium II/400	Pentium II/400	Pentium II/450
128MB / 384MB	128MB / 512MB	128MB / 1GB
512K	512K	512K
Intel	Supermicro	Chaintech
Intel 440 BX	Intel 440 BX	Intel 440 BX
9.6GB IBM	13.8GB IBM	13.8GB IBM
DTTA-371010	DTTA-371440	DTTA-371440
lomega Zip 100	lomega Zip 100	lomega Zip 100

Diamond Fire GL 1000 Pro AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)
3Dlabs Permedia 2	Matrox MGA-G200	Matrox MGA-G200
None	Zoran SoftDVD 2.0	CyberLink Power DVD
ViewSonic P775 (17 / 15.9)	OptiQuest V773-2 (17 / 15.8)	CyberVision 86D (17 / 16.1)
32X Toshiba XM-6202B	2X Pioneer DVD-A02	2X Goldstar DR0-820B DVD
Integrated Crystal CS4611	Ensoniq Audio PCI	Shark Multimedia Predator
Wavetable	Wavetable	Wavetable
MidiPro MD-80	Altec Lansing ACS45W	Altec Lansing ACS45W
None	None	None
■ (K56flex)	■ (K56flex)	■ (K56flex)

1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP
3 / 1	3 / 2	3 / 2
0 / 1	1 / 1	0 / 1
1 / 2 / 2	1 / 2 / 2	1 / 2 / 2
235	300	235

1 year/1 year \$89	3 years/1 year Included	1 year/1 year \$99
-----------------------	----------------------------	-----------------------

GIVE YOURSELVES A LITTLE PEACE OF MIND THIS YEAR.

COMPLETE HOME OFFICE SOLUTION

DELL® DIMENSION® V350
PENTIUM® II PROCESSOR AT 350MHz

- 64MB 100MHz SDRAM
- NEW 12.9GB Ultra ATA Hard Drive
- 17" (15.9" viewable) 1000LS Monitor
- ATI 8MB 3D AGP Graphics
- 40X Max™ Variable CD-ROM Drive
- Yamaha XG 64V Wavetable Sound
- harman/kardon HK-195 Speakers
- 3Com® USR V.90® PCI WinModem
- 30-Day FREE ConnectDirect™ Internet Service*
- Iomega Zip 100MB Internal Drive
- MS® Office 97 Small Business Edition v2.0
- MS Windows® 98/Logitech First Mouse+
- Dell QuietKey® Keyboard
- APC SurgeStation™
- Epson Stylus 600 Color Printer¹
- 3-Year Limited Warranty†
- 1-Year At-home² Service

\$1999

Personal Lease³: \$75/Mo., 36 Mos.⁴
Order Code #501114

ULTIMATE MULTIMEDIA & IMAGING SOLUTION

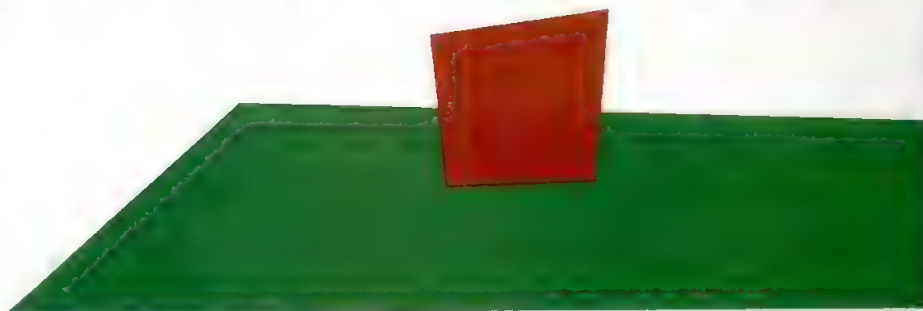
DELL DIMENSION XPS R450
PENTIUM II PROCESSOR AT 450MHz

- 128MB 100MHz SDRAM
- NEW 12.9GB Ultra ATA Hard Drive
- 19" (18.0" viewable, .26dp) Trinitron® P990 Monitor
- 16MB STB nVidia 3D AGP Graphics Card
- 4.8X DVD-ROM Drive and Decoder Card
- Turtle Beach Montego II A3D 320V Sound Card
- ACS-495 Dolby Surround Sound Speakers with Subwoofer
- 3Com USR V.90® PCI WinModem
- 30-Day FREE ConnectDirect Internet Service*
- MS Home Essentials 98, McAfee VirusScan
- MS Windows 98/IntelliMouse™
- Dell QuietKey Keyboard
- HP® 722C DeskJet® Color Printer¹
- HP ScanJet 4100Cse¹
- 3-Year Limited Warranty†
- 1-Year At-home² Service

\$3249

\$3199 AFTER \$50
MAIL-IN REBATE⁵
OFFER ENDS 1/30/99

Personal Lease³: \$121/Mo., 36 Mos.
Order Code #501111



For faster service, please have your order code and keycode available when calling.

¹Personal leasing arranged by Dell Financial Services L.P., an independent entity, to qualified customers; amount of monthly lease payments above based sales tax \$3.77/month; shipping cost due with first payment; no security deposit required; subject to credit approval and availability. Lease terms subject to

²Prices and specifications valid in U.S. only and subject to change without notice. ³For a complete copy of Guarantees or Limited Warranties, write Dell USA L.P., Attn: Warranties, One Dell Way, Roundhouse, Not valid with other Hewlett Packard offers unless otherwise specified by that offer. Offer is limited to qualifying HP DeskJet, ScanJet and All-in-One products. Customer must mail completed rebate coupon postmarked no later than 1/30/99 and received no later than 2/15/99. Customer will receive a \$50 rebate check, payable in U.S. dollars, from Hewlett Packard approximately 8-10 weeks after receipt of rebate materials remote areas. Technician dispatched if necessary pursuant to phone-based troubleshooting with technical support personnel. ⁴40X Max/17X Min. ⁵PC Magazine, July 1998. ⁶Download speeds limited to compatible server equipment required. ⁷Some charges may apply. Intel, the Intel Inside logo and Pentium are registered trademarks and Celeron is a trademark of Intel Corporation. MS, Microsoft, IntelliMouse registered trademarks of Hewlett Packard Corporation. ©1998 Dell Computer Corporation. All rights reserved.



DELL DIMENSION XPS R400
PENTIUM II PROCESSOR AT 400MHz

- \$2299**

DELL DIMENSION V333c
INTEL® CELERON™ PROCESSOR AT 333MHz

- \$1599**

A photograph of a vintage Dell computer setup. On the left is a CRT monitor with a dark screen and a white bezel. In the center is a white keyboard. To the right is a tall, silver-colored tower unit with a floppy disk drive and a CD-ROM drive. The entire setup is placed on a dark, wavy, textured surface. The background is a solid, vibrant red.

[illegible]

Keycode #04920

M-F 7a-11p • Sa-Su 8a-8p CT
In Canada,* call 800-233-0702
In Mexico,* call 001-800-210-7607

BE DIRECT™ **DELL**

www.dell.com/buydell

Micron Millennia 450 MAX

Pentium II/450, 13.8GB disk, 19-inch monitor, SDRAM. Winstone 99: 24. \$2,899 direct. Nampa, Idaho; 888-634-8799, 208-893-3343; www.micronpc.com; 526 at www.pcmag.com/infolink.

• With the Micron Millennia 450 MAX, you get what you pay for: top performance, a clean design, and good service. Gamers, power users, and graphic designers will all appreciate this machine. The tool-free case provides clear access and room to upgrade. Micron offers a choice of bundled software; space-saving, high-quality Monsoon speakers are also included.—*Carlos Carillo*

MidWest Micro Multimedia Pro 450

Pentium II/450, 13.8GB disk, 17-inch monitor, SDRAM. Winstone 99: 21.5. \$2,699 direct. Fletcher, OH; 800-626-0544, 937-28-8582; www.mwmicro.com; 527 at www.pcmag.com/infolink.

• The MidWest Micro Multimedia Pro 450 is a fine all-around machine with a good warranty, but its Creative Labs Sound Blaster AWE64 PCI sound card is one step behind the times, and its STB Velocity 128 AGP is similarly dated and contributed to a below-average score on our graphics tests. Because of problematic DirectX 6.0 drivers, the unit was unable to complete our 3-D tests. Another problem: The ribbons from the LS-120 drive and the Toshiba DVD player plug into slots so close together that one ribbon gets forced out of place.—*RB*

NEC Direction SP E450

Pentium II/450, 13.8GB disk, 19-inch monitor, SDRAM. Winstone 99: 24.7. \$3,189 direct. Mountain View, CA; 888-863-2669, 978-264-8000; www.nec-computers.com; 528 at www.pcmag.com/infolink.

• Yes, the NEC Direction SP E450 has the highest Winstone score in this roundup, and one of the higher prices, too. For the money, you get a well-integrated package with excellent support, suited to new or experienced users. The DVD drive uses software MPEG decoding, which is still not as smooth as hardware-decoded systems. Tool-free access proved a bit tricky, requiring pressing two stiff tabs on the case and sliding simultaneously.—*WLR*

NETIS Professional BestBuy

Pentium II/400, 11GB disk, 17-inch monitor, SDRAM. Winstone 99: 22.4. \$2,276 direct. Milpitas, CA; 800-577-7526, 408-263-0368; www.netistech.com; 529 at www.pcmag.com/infolink.

• The NETIS Professional BestBuy's components are a notch below today's best, but the machine is fairly priced and a solid performer. It offers a tool-free case and plenty of drive bays for expansion but has just one free PCI slot and no available IRQs. Its one-year warranty is shorter than most.—*WLR*

nextPC 350MP

AMD K6-2/350, 13.8GB disk, 19-inch monitor, SDRAM. Winstone 99: 18.2. \$2,899 direct. Fremont, CA; 888-838-7827, 510-659-8500; www.next-pc.com; 530 at www.pcmag.com/infolink.

• Although it includes some good hardware, the nextPC 350MP is overpriced, and as one of three AMD K6-2-based machines in this roundup of mostly 450-MHz Pentium II PCs, it was a predictably poor performer on most of our tests. There is physical expansion room but no free IRQs. The Creative Labs DVD drive offers adequate playback quality; other hardware includes an Ethernet adapter and a 1GB SyQuest SparQ drive.—*MEB*

NexTrend NexStar-400PCP

Pentium II/400, 13.8GB disk, 21-inch monitor, SDRAM. Winstone 99: 21.1. \$3,679 direct. Fremont, CA; 877-833-8833, 510-659-8500; www.nexttrendpc.com; 531 at www.pcmag.com/infolink.

• The NexTrend NexStar-400PCP's \$3,679 price includes so much you may never need to expand it—and that's good, because you might not be able. With a 21-inch monitor, Altec Lansing speakers, an 8GB Seagate tape drive, DVD with hardware MPEG decoding, and a network adapter, as well as Microsoft Office 97 Small Business Edition, the unit sits at the top end of the enthusiast market. It suffers, however, from a lack of free PCI slots. Only one IRQ is available.—*WLR*

Polywell Poly 8450BU

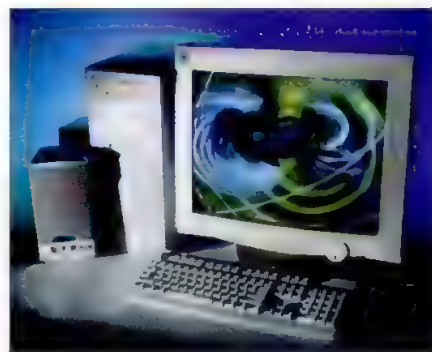
Pentium II/450, 17.4GB disk, 19-inch monitor, SDRAM. Winstone 99: 24.4. \$4,395 direct. South San Francisco, CA; 800-999-1278, 650-583-7222; www.polywell.com; 532 at www.pcmag.com/infolink.

• Though its price is higher than average, the Polywell Poly 8450BU will get the attention of its targeted audience: software developers, CAD users, and graphic artists. Everything about this system is big, from its extremely large although somewhat cluttered case to its storage potential: a 17.4GB disk and a Panasonic PD-2 DVD-RAM drive that accepts DVDs and 5GB rewritable cartridges. The warranty terms are slightly better than average: Parts are covered for three years, labor for five. On-site service is \$75 for one year.—*FJE*

Premio Apollo BX400

Pentium II/400, 17.4GB disk, 21-inch monitor, SDRAM. Winstone 99: 22.1. \$4,100 street. City of Industry, CA; 800-677-6477, 626-839-3100; www.premiopc.com; 533 at www.pcmag.com/infolink.

• A bit pricey but a good performer, the Premio Apollo BX400 should please power users, gamers, and graphics and video-editing artists. The 17.4GB disk, 21-inch MAG monitor, and 100MB Iomega Zip Drive are well suited to



the needs of video editors. The Creative Labs DVD Encore drive offers smooth playback, and Microsoft Office 97 is included. Internal expansion is limited—only one free PCI slot—and technical support is limited to business hours, weekdays.—*Robert S. Anthony*

ProGen Discover MPEGII PII450

Pentium II/450, 9.5GB disk, 19-inch monitor, SDRAM. Winstone 99: 23.9. \$2,149 direct. Tustin, CA; 800-848-1353, 714-566-9200; www.progen.com; 534 at www.pcmag.com/infolink.

• The ProGen PC is designed for the sophisticated multimedia user. Unfortunately, the DVD drive came to PC Magazine Labs nonoperational; we suspect it had the wrong drivers. The system's performance on our tests, however, was mostly above average. It has plenty of expansion room in the case and enough open slots, but no free IRQs.—*MEB*

Quantex QP6/450 SM-4x SE

Pentium II/450, 13.8GB disk, 19-inch monitor, SDRAM. Winstone 99: 23.3. \$2,578 direct. Somerset, NJ; 800-346-6685, 732-563-4166; www.quantex.com; 535 at www.pcmag.com/infolink.

• The Quantex QP6/450 is a good choice for enthusiasts and multimedia designers who want a strong warranty and 24-hour, 7-day technical support. Enthusiasts, especially gamers, will appreciate the fast hard disk, large monitor, DVD drive, and wavetable sound. The graphics card offers strong 2-D and 3-D performance.—*RMP*

Racer Talladega 400

Pentium II/400, 11GB disk, 17-inch monitor, SDRAM. Winstone 99: 20.8. \$2,199 direct. Phoenix; 800-308-8767, 602-304-2424; www.racerpc.com; 536 at www.pcmag.com/infolink.

• The Racer Talladega 400 is a fair choice for power users or gamers on a budget. The unit's weakest points are its low 2-D graphics performance, the lack of free IRQs, and a monitor that's not as sharp as others in this roundup. On the other hand, all the components are easy to access, and the PC has plenty of expansion room, along with a good warranty. The unit's performance was average.—*CC*

DLP VS. LCD: A DIGITAL DIFFERENCE YOU CAN SEE AND FEEL.

By S. E. Easter

DIGITAL IMAGE QUALITY

Incredible digital images are composed of 16.7 million digitally correct colors

DIGITALLY DOWNSIZED

100% digital display system is smaller and lighter than LCD, enabling high performance in projectors as light as 7 pounds.

DIGITAL BRIGHTNESS

Unique digital design produces "digital light," more of which ends up on the screen than with traditional LCD, over 600 lumens.

DLP technology has pioneered a new class of extremely bright ultraportables. A projector weighing under 10 pounds can now deliver over 600 lumens of digital light.

system. DLP technology is able to achieve higher levels of brightness through its all-digital design, producing more usable light than traditional LCD systems for brilliant, lifelike displays.

Another digital advantage is the DLP system's enhanced image quality. The unique digital image projected by a DLP system contains 256 grade levels for each of the primary colors, producing 16.7 million digitally correct color combinations. Projected images appear precise and film-like. And DLP technology's digital design creates a clearer, seamless image, unlike LCD technologies that suffer from the infamous "screen door" effect.

Digital Light Processing technology from Texas Instruments. Another reliable semiconductor innovation from The World Leader In Digital Signal Processing Solutions. Now available in ultraportable projectors.

For more information on DLP technology or for a complete list of manufacturers using DLP technology, call us toll-free or visit us on the Web.



Digital Light Processing™ (DLP™) technology from

Texas Instruments is a revolutionary all-digital technology that enables lighter and smaller projectors. Unlike conventional LCD systems that contain large,

heavy optics, DLP technology allows a smaller, more compact optical system that delivers phenomenal visual impact.

Brightness is a critical performance factor in any projector and an important function of the DLP optical

1-888-DLP-BY-TI, ext. 2420
www.ti.com/dlp/it

Royal Exciting Professional

Pentium II/450, 13.8GB disk, 19-inch monitor, SDRAM. Winstone 99: 21.7. \$2,788 direct. City of Industry, CA; 800-486-0008, 626-855-5077; www.goroyalpc.com; 538 at www.pcmag.com/infolink.

• Although its large cache of game and application software—including Microsoft Office 97 Professional Edition—is a plus for first-time PC buyers, the Royal Exciting Professional lacks commensurate performance. The system comes with top sound components from Altec Lansing and Creative Labs, but it yielded jerky video and choppy audio when tested with a music DVD. The ATI All-in-Wonder Pro includes an integrated TV tuner to support Windows 98's WebTV functions. Technical support is available business hours Pacific time, six days a week.—*RSA*

SAG STA Dual Power Station

Pentium II/400, 13.8GB disk, 19-inch monitor, SDRAM. Winstone 99: 21.9. \$2,400 direct. North Andover, MA; 800-989-3475, 978-683-0339; www.sagelectronics.com; 539 at www.pcmag.com/infolink.

• The STA Dual Power Station gives high-end users an easy expansion path. It was an average performer on most tests but couldn't complete the 3D WinMark tests because of problematic DirectX 6.0 drivers. The DVD drive performed well; images were clear, thanks in part to the hardware MPEG-2 decoder. The 3-D positional speakers were robust even at high levels.—*FJE*

Sys Performance Pro 450BADDD-R1

Pentium II/450, dual 9.6GB disks, 17-inch monitor, SDRAM. Winstone 99: 24.4. \$2,899 direct. Cypress, CA; 800-613-9963, 714-821-3900; www.sys.com; 540 at www.pcmag.com/infolink.

• Gamers will like the 450-MHz Sys Performance Pro 450BADDD-R1's top-notch test scores, especially on our 3-D tests. No software is bundled, however, and you may want



a better monitor. All PCI slots and the AGP slot come filled. The unit includes two graphics cards: a Matrox Millennium and a Diamond Monster 3D II accelerator with 12MB of EDO

DRAM. The system's two IDE disks were set in a RAID 0 configuration, which is both unusual and marginally faster.—*Asa Somers*

Tagram Thunderbolt H2750

Pentium II/450, 13.8GB disk, 17-inch monitor, SDRAM. Winstone 99: 23.8. \$2,199 direct. Costa Mesa, CA; 800-824-7267, 714-979-8900; www.tagram.com; 541 at www.pcmag.com/infolink.

• The Tagram Thunderbolt H2750 is a solid, value-priced work and entertainment PC. For the most part, the unit posted average scores on our tests, with above-average scores for 2-D and 3-D graphics. The unit uses Zoran SoftDVD software, which produced stable and smooth audio and video DVD playback. There is adequate expansion room, but the unit has only one free IRQ. Tagram offers lifetime 24-hour, toll-free technical support.—*RSA*

Tangent Medallion 450X

Pentium II/450, 13.8GB disk, 19-inch monitor, SDRAM. Winstone 99: 23.8. \$2,995 direct. Burlingame, CA; 888-826-4368, 650-342-9388; www.tangent.com; 542 at www.pcmag.com/infolink.

• The Medallion 450X is an admirable system for serious game players or graphics professionals. The unit posted a top 3D WinMark 99 score, and its 2-D graphics score was above average. This midtower offers ample room but only one free IRQ. The unit includes a Toshiba DVD drive and an HP CD-Writer Plus CD-RW drive. DVD video playback was adequate, and audio quality was excellent.—*RSA*

Tiger K-Series 333 3D Plus

AMD K6-2/333, 16.8GB disk, 19-inch monitor, SDRAM. Winstone 99: 17.6. \$1,889 direct. Miami, FL; 800-830-0056, 305-229-1119; www.tigerdirect.com; 543 at www.pcmag.com/infolink.

• Designed for the small business or home office, the Tiger PC may be worth a look if you're on a tight budget. Though its performance was predictably behind the pack, the unit includes Microsoft Office 97 Small Business Edition, a strong sound system, a large disk and monitor, and an LS-120 drive. The warranty and support are limited, however.—*FJE*

Total Peripherals Serengeti 400

Pentium II/400, 9.9GB disk, 17-inch monitor, SDRAM. Winstone 99: 22. \$2,415 direct. Northboro, MA; 800-923-7718, 508-393-1777; www.totalpc.com; 545 at www.pcmag.com/infolink.

• The Total Peripherals PC is a well-designed system with good performance and ample storage, including an Iomega Zip Drive. The Serengeti should appeal to power users, especially those heavily dependent on graphics performance: Its 2-D and 3-D graphics results were especially strong. Accessories include headphones and a surge protector.—*FJE*

Unicent Extreme Z300 3D

AMD K6-2/300, 9.6GB disk, 19-inch monitor, SDRAM. Winstone 99: 17.1. \$1,699 direct. Aurora, OH; 800-319-9250, 216-344-2649; www.unicent.com; 546 at www.pcmag.com/infolink.

• Budget-minded multimedia buffs and home professionals will like the Unicent PC's big monitor, solid components, and low price. But predictably, the unit's 300-MHz AMD K6-2 CPU turned in lackluster test scores, and its software MPEG-2 decoder produced uninspired DVD video, dropping frames and occasionally stuttering. Accessing the unit's components for servicing or upgrades also proved a bit difficult. On-site service is included if you live within 200 miles of a metropolitan area.—*AS*

Unitek Tailwind UT-PII400

Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM. Winstone 99: 22. \$2,099 direct. Ontario, CA; 800-944-5650, 909-930-5700. 547 at www.pcmag.com/infolink.

• Despite no free IRQs and a one-year warranty, the Unitek remains a good choice for digital artists who seek solid performance at a competitive price. It uses a Diamond Fire GL 1000 Pro AGP card with advanced tools for CAD/CAM and digital content creation. Because of problematic DirectX 6.0 drivers, the unit could not complete our 3D WinMark tests.—*RMP*

Xi 400 MTower GSP

Pentium II/400, 13.8GB disk, 17-inch monitor, SDRAM. Winstone 99: 21.5. \$2,299 direct. San Clemente, CA; 800-432-0486, 949-498-0858; www.xicomputer.com; 548 at www.pcmag.com/infolink.

• With mostly average test scores, a good warranty, and an easily serviced case, the Xi unit is a good value for any bargain-conscious home professional. The system delivered a good 2-D graphics score. The monitor flickered slightly at better-than-XGA resolutions, and DVD playback was fair, with only slight pixilation in some areas of motion.—*AS*

Zenon Dream Media Pro

Pentium II/450, 13.8GB disk, 17-inch monitor, SDRAM. Winstone 99: 23.7. \$2,199 direct. City of Industry, CA; 800-899-6119, 626-935-1860; www.zenontech.com; 549 at www.pcmag.com/infolink.

• Enthusiasts and gamers should consider the Zenon Dream Media Pro: It has a low price, powerful components, and strong graphics; it earned above-average scores on our 2-D and 3-D graphics tests. No DVD player software was loaded on our test PC, however (Zenon will fix the problem by the time you read this). Our unit's case had warped slightly, so the cards would not sit properly in their slots if you tried to screw them in. The motherboard can slide out easily, simplifying servicing. The one-year warranty is shorter than most.—*FJEPC*

TKO your TCO.

Intel® PRO/100+ Management Adapter

The first network adapter offering comprehensive support for remote PC management. Delivers all the key benefits of the Wired for Management (WfM) baseline specification, including powerful features like Wake on LAN.*

Intel® PRO/100+ Server Adapter

Meets WfM baseline specs for servers, for improved server management. Advanced server technologies such as Adaptive Load Balancing and Adapter Fault Tolerance boost server throughput and availability.

Intel® PRO/100 Mobile Adapter

LAN and modem support in a single, manageable, high-performance CardBus® card. Connect like a desktop with flexible 10/100Mbps connectivity, as well as 56K modem support for peak performance on the road.

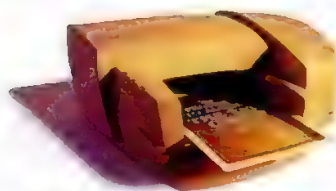


Finally there's a family of managed adapters that will have your Total Cost of Ownership (TCO) hitting the gas in no time. How do they do it? Intel's WfM-enabled family of managed adapters for servers, desktops and mobile PCs offers unattended after-hours and remote asset management and maintenance. Which means you spend less time managing your network. And less time spent means more money saved. For more information on how Intel's family of managed adapters can let you take control of your TCO, visit our Web site. ► www.intel.com/network/tco/

FasterSimpler
NETWORKS

intel®

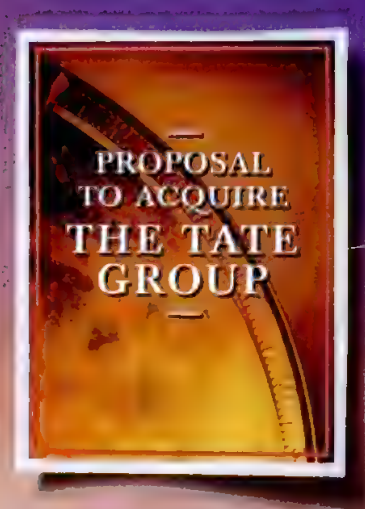
© 1998 Intel Corporation. All rights reserved. Intel, the Intel logo, and Intel PRO/100 are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.



HP 2000C
Professional Series, \$799*

HP Color Layering. Better color, no matter what you're printing.

Ahh, the world of big business. How do we fit in? Nicely, what with our new inkjet office printer, the HP 2000C Professional Series. It's fast, networkable and



offers our exclusive PhotoREt Color Layering technology. Unlike conventional color printers, which place red dots next to yellow dots to create the illusion of orange, our process literally mixes the colors to create real orange. Or purple. Or tons of other colors. All at an impressive 4ppm. Visit www.hp.com/go/officecolor.

CORPORATE PCs

PC Magazine Labs emphasizes manageability as we test 62 corporate machines, divided into high-end Windows NT-based systems and mainstream Windows 95-based units.

By Cade Metz

IN THIS REVIEW

Acer America Corp.	162
ACMA Computers Corp.	162
All Computer Technology	162
Axis Systems	162
Compaq Computer Corp.	163
Comtrade	163
Dell Computer Corp.	163
DTK Computer Inc.	166
Duracom Computer Systems Inc.	166
Gateway	166
GST/Micro City Inc.	167
Hewlett-Packard Co.	167
Highwave Technologies Inc.	167
HiQ Computer Systems	167
IBM	176
Maximus Computers Inc.	177
Mega Computer Systems	182
Micron Electronics Inc.	183
MidWest Micro	186
NEC Computer Systems Division	186
NexTrend Technology Inc.	190
Polywell Computers Inc.	190
ProGen Systems	190
Quantex Microsystems Inc.	195
Reason Computer	195
Royal Computer	195
SAG Electronics	195
Sys Technology Inc.	198
Tagram System Corp.	198
Tangent Computer Inc.	198
Toshiba America Information Systems Inc.	198
Total Peripherals Inc.	198
Unicent Technologies Inc.	198
Xi Computer Corp.	198
Zenon Computer Inc.	198
Price/Performance Index	154
Ratings	156
Editors' Choice	158
Performance Tests:	
High-End	162
Mainstream	166
Summary of Features	176

■ Support

Bigger vendors tend to offer better technical support for longer hours. As a rule, they include on-site service, but smaller vendors are providing longer warranties and are increasingly offering on-site service as well. If you have offices outside North America, however, only the top vendors will consistently be able to help you.



Join Us Online

for interactive versions of our benchmark tests and summary of features.

www.pcmag.com

■ True manageability is still limited

A handful of top vendors dominate, and if you need full remote features, they're your best bet. If you're in a smaller company, however, or don't need complete remote management, look carefully among smaller vendors and you'll find some well-done, Intel LANdesk Client Manager-based solutions.

V75

COMPAQ

■ Servicing and upgrading

You'll find that the top vendors and a smattering of smaller ones have tool-free cases; both groups have accessible components and even slide-out motherboards. Units from the larger vendors also have swing-away drive bays and power supplies or tool-free drive changers but don't offer as much upgrade room.

■ Performance

Although that's not the cornerstone of a corporate system, many PCs here boast 450-MHz and 400-MHz Pentium II processors with more than enough muscle for standard business tasks. Some have high-end graphics subsystems with Matrox G200 or Number Nine Revolution IV cards that are ready to tackle 3-D functions.

IN CORPORATE AMERICA, the desire is not for new PCs but for new managed PCs, machines accompanied by hardware, software, and support policies capable of reducing long-term costs. Coupled with a remote-management application and encased in a tractable chassis, the ideal managed PC is readily monitored from afar and, if need be, readily opened up and repaired. But should you be unable to repair the machine on your own, its manufacturer is also a phone call away, willing to provide rapid and inexpensive support.

In the following pages, we review 62 managed PCs meant to approach this ideal. Most fall well short, but several come remarkably close. As one might expect, if you're in a large installation and need truly manageable PCs, you should look to the major vendors: Compaq, HP, IBM. Not far behind them are Dell, Gateway, Micron, and NEC. We also found that several smaller vendors are doing a good job; their units would fit well in branch offices or small to midsize networked environments. For a quick look at how all of these machines stack up in the areas of manageability, serviceability/upgradability, performance, and service offerings, check out our new ratings table.

REVIEW CRITERIA

These 62 machines represent 35 manufacturers—every major vendor save AST Research, which declined to participate. They are divided into two categories: high-end Windows NT systems, priced roughly between \$2,000 and \$3,000, and mainstream Windows 95 PCs, typically between \$1,000 and \$2,000. Per our request, each high-end machine is outfitted with a minimum 350-MHz Pentium II CPU, 128MB of RAM, a 6GB or larger IDE hard disk, and a 17-inch or larger monitor. The mainstream systems, slightly less potent, are each required to offer an AMD K6-2/300, a Cyrix MII/300, or a minimum 266-MHz Pentium II CPU; 64MB of RAM; a 4GB or larger hard disk; and a 15-inch or larger monitor. Each machine is further outfitted with a graphics adapter using at least 4MB of memory, a CD-ROM drive, a 10/100

Ethernet adapter, business audio, a DMI 2.0 service layer, and a package for remote desktop management.

Per usual, we've tested each PC with our latest benchmark test suites, but our rubric for judging these systems goes beyond performance. To determine the true worth of these systems, we've heavily considered their remote-management software, chassis designs, and service policies.

REMOTE MANAGEMENT

If you're running a widespread corporate network, the most important aspect of each system is its management solution. All 62 machines reviewed here are equipped for remote management, a means of taking a machine's inventory and monitoring its health over a network connection. Not all machines do this well, but some do it very well, augmenting basic management features with several additional capabilities.

As said, each system complies with the Desktop Management Interface (DMI) 2.0 specification, a standard method of examining a machine's components via software. Thus, you can inventory each of them from a remote console using a DMI-compliant software package, such as Intel's LANDesk Client Manager (LDCM). Fifty-three of the machines bundle LDCM as their DMI package. If a system is properly equipped, the latest version of LDCM can also remotely reboot and shut down the machine; monitor hardware voltages, temperatures, and fan speeds; check for chassis intrusions; and identify imminent hard disk and memory problems.

To judge the management capabilities of these LDCM systems, we attached them to a network and attempted to access each from a remote LDCM console. Except for vendors that did not preinstall LDCM, most every vendor allowed us to take at least a partial DMI inventory of its PCs, though some permitted a more complete list than others. Adequate health monitoring, however, was less prevalent, and few

used LDCM to its fullest capability. Some of the best solutions were provided by DTK, Gateway, IBM, NEC, NexTrend, Quantex, and Toshiba, among others.

Two PCs from ACMA Computers use Prescient Client System Manager as their management solution. Prescient is DMI-compliant; it allows you to inventory a system remotely but doesn't provide health monitoring. The high-end Duracom ProForma, meant to be a server rather than a desktop, ships with LANDesk Server Manager instead of LDCM. Such an application is of little use on a client.

Compaq, Dell, and HP use only their own proprietary management solutions: Intelligent Manageability, OpenManage, and TopTools, respectively. OpenManage

*Top service is key:
this year our
readers gave Dell,
HP and IBM*

is comparable to LDCM, but Intelligent Manageability and TopTools are more proficient. Among other things, they let you remotely flash a machine's BIOS and disable many of its hardware components.

*the highest marks
on our annual
survey.*

Also in the Compaq and HP class is IBM, which augments LDCM with several other tools, providing remote BIOS flashing, component

locking, automatic hard disk backup, and Alert on LAN technology (which sends an alert if someone unplugs a system's power source, disconnects its NIC, or removes its CPU), among other things.

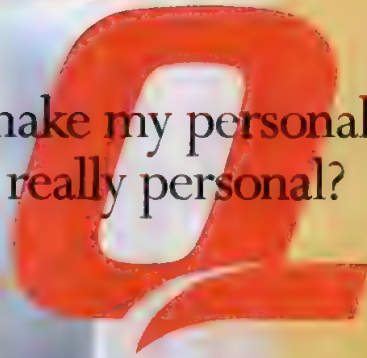
Yet even with a Compaq, HP, or IBM system you'll need a larger desktop or enterprise management package for optimum benefit. Intelligent Manageability, LDCM, OpenManage, and TopTools are simply first steps toward the effective management provided by such a package as Microsoft SMS. Configuring such packages, however, is a laborious and complicated process. In "Taming the PC Jungle," later in this issue, we discuss the varying ability of larger third-party suites to manage these PCs. Many PCs could be readily queried and monitored—including those from the familiar market leaders and from other vendors such as Acer, Axis, GST, NEC, NexTrend, and Quantex—but most proved problematic.

EASE OF UPGRADE AND REPAIR

A proficient corporate system can not only be easily managed from a remote console,

Our Contributors: CADE METZ and ROBERT S. ANTHONY are senior writers for *PC Magazine*. MARY E. BEHR is a staff editor, and BRUCE BROWN is a contributing editor. JON A. HILL is a frequent contributor to *PC Magazine*. RICHARD FISCO was the project leader, and ANUSH YEGYAZARIAN was the associate editor in charge of this story.

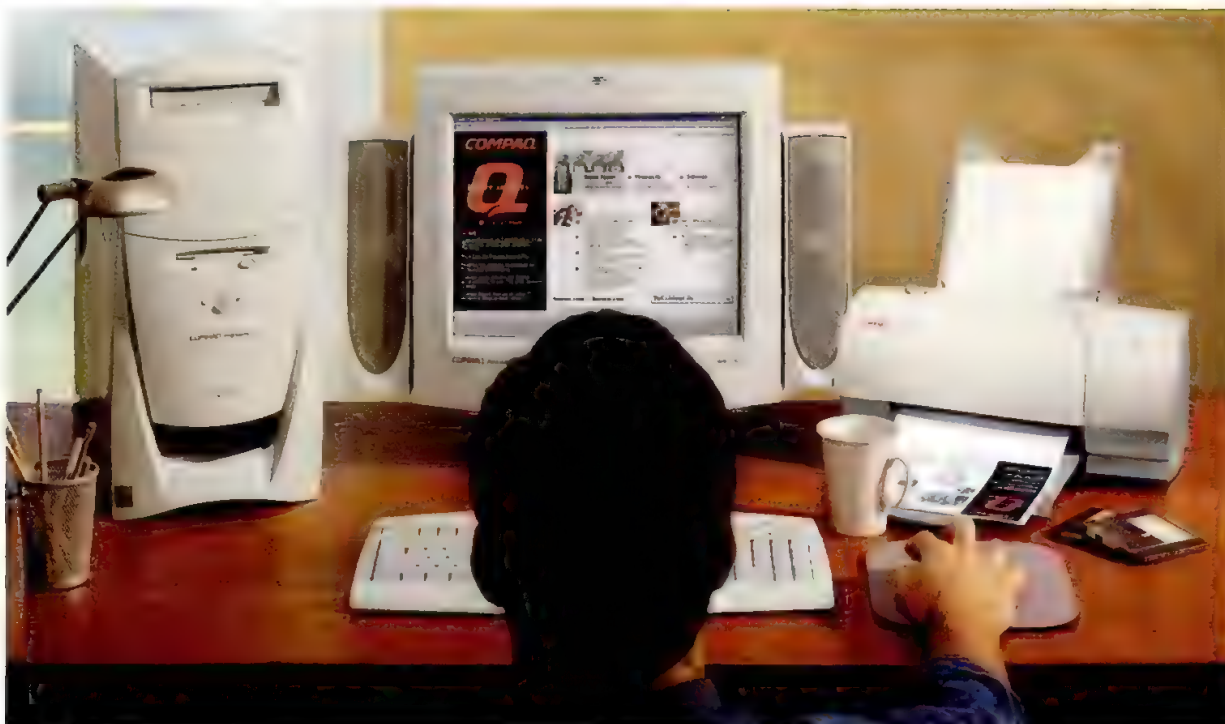
How do I make my personal computer
really personal?



Compaq Presario® 5600-450

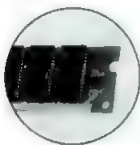


COMPAQ



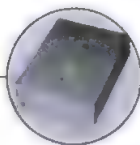
Easy. Have Compaq build one for you. Nobody knows what your computer needs are as well as you do. So shouldn't you be the one to decide what goes into yours? When you order these Presario Internet PCs you're in the driver's seat. You choose how much memory you want, hard drive size, whether you want a CD-ROM drive or DVD, advanced graphics, video memory, even the type of monitor you want. And you don't need a degree in computer engineering to build the computer that best suits your needs — we'll build it for you. And if you're not sure what features are best for you, we'll help you decide. Just call Compaq, visit our website, or stop by a Compaq *Built For You Custom PC Center* at select retailers. Bring the world's best-selling computer home today.

Here are some of the features we can personalize for you:



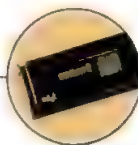
Memory

Speed up performance by choosing from 64 MB to a whopping 384 MB of Synchronous DRAM.



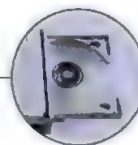
Hard Drive Size

Whether you're writing the great American novel or just surfing the Net, we've got the hard drive size that's right for you.



Processor Speed

You can choose from the latest Intel® Pentium® II Processors, including the new 450 MHz.



CD-ROM/DVD

A built-in Zip drive, CD-ROM, or DVD drive is the perfect way to accessorize and get the most from your Presario PC.



Monitor/Display

All our monitors assure that your applications will be displayed boldly and vividly.



All prices shown are Compaq Direct selling price after applicable rebate. Prices shown do not include applicable sales tax and shipping. Products and prices valid in U.S. only. Actual retail price may vary. Specifications and prices are subject to change or cancellation without notice. Not all Compaq Presario models available in all retail stores. *50 free hours of Internet access is offered when Compaq Easy Internet Access is chosen from Compaq Internet Setup. The 50 free hours must be used over a 30-day period from initial setup. A valid credit card is required to initiate service, although no charges will be incurred until the 50-hour trial has expired. **\$100 mail-in rebate from Compaq upon activation of this free trial of Compaq Easy Internet Access. Rebate offer valid only in the USA and expires 4/30/99. See rebate coupon included with product for additional terms and conditions. †For hard drives, GB = billion bytes. ‡ITU-T V.90 modems are designed only to allow faster downloads from K56flex or V.90 compliant digital sources. Maximum achievable download transmission rates are currently unknown, may not reach 56 kilobits per second (Kbps), and will vary with line conditions. †24X Max CD-ROM data transfer rates may vary from 1500 to 3600Kbps. ‡32X Max CD-ROM data transfer rates may vary from 1800 to 4800Kbps.

COMPAQ

Here are just a few of the hundreds of possible combinations:



(Shown with Presario MV700 Monitor)

Compaq Presario 5600-450

\$2,649

-\$100 mail-in rebate**

\$2,549

Base price includes:

- Intel® Pentium® II Processor, 450 MHz
- 13.5 GB UltraDMA Hard Drive¹
- 5X DVD-ROM Drive¹
- 128 MB SyncDRAM expandable to 384 MB
- 56K ITU v.90 Modem²
- Digital Creativity Imaging Center w/1394
- Diamond Viper 550 w/16 MB SDRAM
- 10 Mbps Ethernet port, Cable Modem Ready
- JBL Pro Premium Speakers w/Subwoofer
- New! Iomega Zip Built-In™ Drive
- Microsoft® Featured Home Collection
- Microsoft Windows®98
- Compaq V910 19" Monitor (18.0" VIA)

Personalize it by choosing:

- 1.5 Mbps U-ADSL/56K v.90 Digital Modem:* Add \$49
- 256 MB SyncDRAM: Add \$250
- 16.8 GB Hard Drive:¹ Add \$139



(Shown with Presario MV700 Monitor)

Compaq Presario 5600-450

\$2,199

-\$100 mail-in rebate**

\$2,099

Base price includes:

- Intel Pentium II Processor, 450 MHz
- 13.5 GB UltraDMA Hard Drive¹
- 32X Max CD-ROM Drive⁴
- 128 MB SyncDRAM expandable to 384 MB
- 56K ITU v.90 Modem²
- 2X AGP Graphics w/8 MB SGRAM
- 10 Mbps Ethernet port, Cable Modem Ready
- New! Iomega Zip Built-In™ Drive
- Microsoft Featured Home Collection
- Microsoft Windows98
- Compaq V720 17" Monitor (15.9" VIA)
- JBL Pro Speakers

Personalize it by choosing:

- 16.8 GB Hard Drive:¹ Add \$139
- Diamond Viper 550 w/16 MB SDRAM: Add \$50



(Shown with Presario MV700 Monitor)

Compaq Presario 5600-350

\$1,599

-\$100 mail-in rebate**

\$1,499

Base price includes:

- Intel Pentium II Processor, 350 MHz
- 8.0 GB UltraDMA Hard Drive¹
- 32X Max CD-ROM Drive⁴
- 64 MB SyncDRAM expandable to 384 MB
- 56K ITU v.90 Modem²
- 2X AGP Graphics w/8 MB SGRAM
- 10 Mbps Ethernet port, Cable Modem Ready
- New! Iomega Zip Built-In™ Drive
- Microsoft Featured Home Collection
- Microsoft Windows98
- Compaq V720 17" Monitor (15.9" VIA)
- JBL Pro Speakers

Personalize it by choosing:

- 128 MB SyncDRAM: Add \$100
- Digital Creativity Imaging Center: Add \$49

Compaq Presario 5600-450

\$3,099

-\$100 mail-in rebate**

\$2,999

Base price includes:

- Intel Pentium II Processor, 450 MHz
- 16.8 GB UltraDMA Hard Drive¹
- 5X DVD-ROM Drive¹
- 256 MB SyncDRAM expandable to 384 MB
- 56K ITU v.90 Modem²
- Diamond Viper 550 w/16 MB SDRAM
- 10 Mbps Ethernet port, Cable Modem Ready
- JBL Pro Premium Speakers w/Subwoofer
- New! Iomega Zip Built-In™ Drive
- Microsoft Office 97 SBE v.2.0
- Microsoft Windows98
- Compaq V910 19" Monitor (18.0" VIA)

Personalize it by choosing:

- 1.5 Mbps U-ADSL/56K v.90 Digital Modem:* Add \$49
- Fast Ethernet 10/100 NIC: Add \$69

Compaq Presario 5600-400

\$2,099

-\$100 mail-in rebate**

\$1,999

Base price includes:

- Intel Pentium II Processor, 400 MHz
- 8.0 GB UltraDMA Hard Drive¹
- 32X Max CD-ROM Drive⁴
- 64 MB SyncDRAM expandable to 384 MB
- 56K ITU v.90 Modem²
- 2X AGP Graphics w/8 MB SGRAM
- 10 Mbps Ethernet port, Cable Modem Ready
- New! Iomega Zip Built-In™ Drive
- Microsoft Office 97 SBE v.2.0
- Microsoft Windows98
- Compaq V910 19" Monitor (18.0" VIA)
- JBL Pro Speakers

Personalize it by choosing:

- 128 MB SyncDRAM: Add \$100
- Presario FP500 Flat Panel Monitor: Add \$430

Compaq Presario 5600-400

\$1,950

-\$100 mail-in rebate**

\$1,850

Base price includes:

- Intel Pentium II Processor, 400 MHz
- 10.0 GB UltraDMA Hard Drive¹
- 5X DVD-ROM Drive¹
- 64 MB SyncDRAM expandable to 384 MB
- 56K ITU v.90 Modem²
- 2X AGP Graphics w/8 MB SGRAM
- 10 Mbps Ethernet port, Cable Modem Ready
- New! Iomega Zip Built-In™ Drive
- Microsoft Featured Home Collection
- Microsoft Windows98
- Compaq V720 17" Monitor (15.9" VIA)
- JBL Pro Speakers

Personalize it by choosing:

- 1.5 Mbps U-ADSL/56K v.90 Digital Modem:* Add \$49
- 13.5 GB Hard Drive:¹ Add \$50
- Diamond Viper 550 w/16 MB SDRAM: Add \$50

Buy one of these computers and get **50 free hours** on the Net.³ Plus, get a **\$100 rebate** on these select Compaq Presario minitower or desktop PCs when you sign up for this Compaq Easy Internet Access free trial.⁴

Buy direct from Compaq, or purchase yours at your favorite retailer. Call **1-800-345-8244**. Or visit us at **www.athome.compaq.com/ad-pcm**



Visit a Compaq
Buils For You
Custom PC Center
at select locations of
these retailers:

ABC Warehouse,
Best Buy,
Brandsmart USA,
Circuit City,
h.h. Gregg,
Nebraska Mega Mart,
Office Depot,
OfficeMax,
RadioShack,
Staples.

Take advantage of
Compaq values at any of
these qualified retailers:

ABC Warehouse,
American Appliance,
American TV,
Best Buy,
Big City Express,
Brandsmart USA,
Campo Electronics,
Circuit City, CompUSA,
CompUSA Direct, Computer City,
Computer Discount Warehouse,
Computer Town, Conn's,
DataVision, Fred Meyer,
Fry's Electronics,
Future Shop,
the good guys!,
h.h. Gregg, Insight,
J&R Computer World,
Micro Center,
MicroWarehouse,
Multiple Zones,
Nationwide Computers & Electronics,
Nebraska Mega Mart,
Nobody Beats the Wiz,
Office Depot, OfficeMax,
PC Connection, PC Mall,
PC Richard & Son,
PC Warehouse,
RadioShack,
RCS Computer Experience,
Sears, Staples,
Sun TV & Appliances, Inc.,
Tiger Direct,
Tops Appliance City,
T-Zone.



Compaq Presario 1800-266

\$2,499
-\$100 mail-in rebate**

\$2,399

Base price includes:

- Intel® Pentium® II Processor, 266 MHz
- 12.1" TFT Active Matrix Display
- 64 MB SyncDRAM expandable to 160 MB
- 4.0 GB UltraDMA Hard Drive¹
- 24X Max CD-ROM Drive²
- 56K ITU v.90 Modem²
- Smart Lilon Battery
- 512 KB L2 Pipeline Burst Cache
- 256-bit Accelerated Graphics w/2.5 MB VRAM
- Microsoft® Office 97 Small Business Edition
- Microsoft Windows®98

Personalize it by choosing:

- 96 MB SyncDRAM: Add \$100
- 6.4 GB Hard Drive:¹ Add \$200
- Brief Carrying Case: Add \$119



More value from Compaq!

All Compaq Presario 5600 Series Custom "Buils For You" PCs now include an iomega Zip Built-In[™] Drive. So don't delay — call today or visit your nearest participating Compaq "Buils For You" retailer. (Presario 5170 shown.)

Every Compaq product comes with a standard one-year limited warranty⁷ and the assurance of our Extra Mile Service, the most comprehensive and flexible PC support available. You'll have access to fast, accurate, 7x24 technical support via the phone or Web.



Compaq Presario 1800-300

\$2,699
-\$100 mail-in rebate**

\$2,599

Base price includes:

- Intel Pentium II Processor, 300 MHz
- 12.1" TFT Active Matrix Display
- 64 MB SyncDRAM expandable to 160 MB
- 4.0 GB UltraDMA Hard Drive¹
- 24X Max CD-ROM Drive²
- 56K ITU v.90 Modem²
- Smart Lilon Battery
- 512 KB L2 Pipeline Burst Cache
- 256-bit Accelerated Graphics w/2.5 MB VRAM
- Microsoft Office 97 Small Business Edition
- Microsoft Windows98

Personalize it by choosing:

- 96 MB SyncDRAM: Add \$100
- 6.4 GB Hard Drive:¹ Add \$200
- 2nd-Generation DVD-ROM Drive:³ Add \$200



Compaq Presario 1800-300

\$3,399
-\$100 mail-in rebate**

\$3,299

Base price includes:

- Intel Pentium II Processor, 300 MHz
- 13.3" TFT Active Matrix XGA Display
- 96 MB SyncDRAM expandable to 160 MB
- 6.4 GB UltraDMA Hard Drive¹
- 2nd-Generation DVD-ROM Drive³
- 56K ITU v.90 Modem²
- Smart Lilon Battery
- 512 KB L2 Pipeline Burst Cache
- 256-bit Accelerated Graphics w/2.5 MB VRAM
- Microsoft Office 97 Small Business Edition
- Microsoft Windows98

Personalize it by choosing:

- 160 MB SyncDRAM: Add \$250
- Executive Leather Carrying Case: Add \$200



Compaq IJ 200

\$129⁹⁹

- Single-head thermal inkjet technology
- Up to 600 x 600 DPI resolution
- Sharp text and sharp color prints
- Print Speeds:
Up to 3 1/4 pages per minute black
Up to 1 1/2 pages per minute color
- Paper tray holds up to 30 sheets



EXTRA MILE SERVICE

Buy direct from Compaq, or purchase yours at your favorite retailer.
Call **1-800-345-8244**. Or visit us at **www.athome.compaq.com/ad-pcm**



¹The 5X DVD-ROM Drive transfer rate is up to 8,750 KB/s compared to 1,352 KB/s for 1X DVD-ROM Drives. ²2nd-Generation DVD-ROM Drives run at a higher maximum transfer rate of up to 2.76 MB/s compared to 1st Generation DVD-ROM Drives which run at a maximum transfer rate of up to 1.348 MB/s. One year parts and labor. Labor for desktop systems is carry-in service with on-site service during the first 90 days of ownership. Labor for notebook systems is pick-up service. ³U-ADSL updates may be downloaded from Compaq's Website when available. The 1.5 Mbps U-ADSL/56K v.90 modem protocol is designed to allow faster downloads from U-ADSL, K56flex, or v.90 compliant digital sources. Availability of U-ADSL services will vary by region and Internet Service Provider (ISP), and may differ from v.90 ISP services. Maximum achievable download transmission rates with U-ADSL and K56flex/v.90 are currently unknown, may not reach 1.5 Mbps or 56 Kbps respectively, and will vary based on service provider, line conditions, and distance. Compaq is not liable for pictorial or typographical errors in this advertisement. Compaq, the Compaq Logo, and Presario registered in U.S. Patent and Trademark Office. Microsoft, MSN, and Windows are registered trademarks of Microsoft Corporation. Intel, the Intel Inside Logo, and Pentium are registered trademarks of Intel Corporation. Product and company names mentioned herein may be trademarks and/or registered trademarks of other companies. **Call Compaq Monday-Friday 7:00am-11:00pm (CST), Saturday and Sunday 7:00am-7:00pm (CST).** ©1998 Compaq Computer Corporation. All rights reserved.

COMPAQ
Better answers.™

RATING PC COMPANIES



**JOIN US
ONLINE**
Please join us
online for an
extended
version of the
vendor service
offerings table.
www.pcmag.com

The best PC companies provide more than hardware. Scrutinize their mix of service offerings, support capabilities, and consulting services as you make your PC buying decision. *By Anush Yegyzarian*

Computer makers can put together the right components to give you a machine that will do what you need quickly and cheaply. As companies struggle to win customers, their service and support offerings come to the fore as key differentiators. In this special pullout section, we've gathered the results of our July 1998 Service and Reliability Survey (we list all the PC vendors reviewed in this issue). The top-rated vendors were Dell, Hewlett-Packard, and IBM. We also include a table with specifics about vendors' service and support policies, as well as a summary of the extra consulting services offered by four major vendors: Compaq, Dell, HP, and IBM.

THE BAR

Buyers who haven't negotiated a company-wide service contract shouldn't settle for less than a three-year-parts, one-year-labor warranty, with at least one year of on-site service.

Good vendors will also include round-the-clock technical support for the life of the product, return your PC quickly (within 48 hours) in case of repair, pay for shipping both ways, and have detailed technical information and all relevant drivers available on their Web sites.

If you're considering an unfamiliar vendor, look over its return policy. Most vendors and retail stores these days charge a restocking fee; the specifics vary widely.

None of the vendors we examined does it all. Evaluate your needs carefully and know which compromises you can afford to make. Remember: In the case of large accounts, vendors both great and small are willing to negotiate.

DETAILS MATTER

Larger vendors offer more consistent service and have the staff to meet the demands of their customers, but smaller vendors may give you

Vendor Service and Reliability

We rate vendors for which we received at least 50 responses in our latest Service and Reliability Survey of 17,000 subscribers. We analyzed the data using a *t-test*, a standard statistical procedure. For details, see our July 1998 issue, page 219. The **satisfaction** rankings reflect respondents' experiences with **reliability**, **repair**, and **technical support** over the past two years. **Units needing repair** refers to the proportion of the desktops that respondents said needed repair during the past year. **Buy again?** indicates the proportion of respondents who would buy a new PC from the same vendor.

- Significantly better than average
- Average
- Significantly worse than average

	Satisfaction with			Units needing repair over the past 12 months	Buy again?
	Reliability	Repair	Technical support		
Acer	○	○	○	●	○
Compaq	●	○	●	●	●
Dell	●	●	●	●	●
DTK	○	○	○	○	●
Gateway	●	●	●	○	●
Hewlett-Packard	●	●	●	●	●
IBM	●	●	●	●	●
Micron	●	●	●	○	●
MidWest Micro	○	●	●	○	○
NEC	○	○	○	○	●
Quantex	●	●	●	○	●
Toshiba	○	○	○	○	○

Turn on-site	Average turnaround time for PC repair	Shipping paid	Telephone tech-support duration	Telephone tech-support provider	Automated fax-back service number	Bundled software support	Money-back guarantee	Restocking fee
Year	Varies	Return only	Life of product	Aberdeen	N/A	Yes	35-day	None
	Varies	Return only	Life of product	Acer	800-554-2494	Yes	None	None
	24 hours	Return only	Life of product	ACT	N/A	OS and drivers only	30-day	Varies
	3 business days	Both ways	Life of product	Axis	N/A	Yes	30-day	None
On 99 (24 hours, 1999.00-5.00)	24 hours	Both ways	Life of product	Compax	800-345-1518	Yes	30-day	Varies
Year	Next business day	Return only	3 years	CompUSA	N/A	Yes	10-day	15%
	5-7 days	Return only	Life of product	CyberMax	800-437-4392	Yes	30-day	20%
	24 hours	Return only	3 years	DMi	N/A	Yes	7-day	15%
	N/A	N/A	Life of product	Del	800-950-1329	Yes (30 days)	30-day	None
Year	24 hours	Both ways	Life of product	Dell	512-950-1329	Yes	30-day	None
	48 hours	Both ways	2 years	DTK	800-806-1365	Yes	None	15%
	7-10 days	Return only	Life of product	Gateway	800-846-4526	MS, Gateway only	30-day	None
	48 hours	Return only	Life of product	GST	N/A	Yes	30-day	15%
Year	48 hours	Return only	Life of product	Hertz	N/A	Yes (30 days)	None	15%
	48 hours	Return only	1 year	HP	800-333-1917	Yes	30-day	N/A
	30 days	Return only	Life of product	Highwave	N/A	No	30-day	15%
	2 business days	Return only	Life of product	HiQ	N/A	Yes (standard software configuration)	30-day	30-60 days, 10% no returns thereafter
Year	24-48 hours	Both ways	3 years	IBM	800-426-3395	Yes (30 days)	Varies	Varies
	48 hours	Return only	1 year	ITI	N/A	Yes	7-day	15%
	72 hours	First year, both ways; return only thereafter	For PCs, lifetime, for OS, 90 days	Kingdom	N/A	OS only (90 days)	30-day	None
	48-72 hours	Return only	Life of product	Maximus	N/A	Yes	30-day	None
Year	24 hours for first 30 days, 48 hours thereafter	Return only	Life of product	Mega	N/A	No	30-day	None
	48 hours	First 4 months, both ways; return only thereafter	Life of product	Micro Express	949-852-0706	No	30-day	None
	48 hours	Return only	3-5 years	Micron, third party	N/A	Yes	30-day	Varies
	72 hours	Return only	Life of product	MidWest Micro	800-445-2025	Yes	30-day	None
Year	72 hours	Return only	3 years	NEC	888-306-4636	Yes	30-day	None
	24-48 hours	Return only	1 year	NET S	N/A	Yes	None	15%
	4 days	Return only	3 years	nextPC	N/A	No	30-day	None
	4 days	Return only	3 years	NextTrend	N/A	No	30-day	None
Year	72 hours	Return only	Life of product	IAI for first year; Polywell thereafter	N/A	No	30-day	10%
	24 hours (with inventory)	Return only	Life of product	Premie	N/A	OS only	30-day	20%
	48 hours	Return only	Life of product	ProGen	N/A	Yes	30-day	None
	24-48 hours	Both ways	Life of product	Quantex	800-419-4123	Yes	30-day	None
Year	3-5 business days	Both ways	Life of product	Racer	N/A	Yes	None	25%
	24 hours	Return only	Life of product	Reason	N/A	Yes	60-day	None
	5 business days	Return only	Life of product	Royal	626-855-4695	OS only	30-day	None
	24 hours	Return only for multi-processor PCs; both ways	Life of product	SAG	N/A	Yes	30-day	10-30%
Year	48 hours	For PCs, return only; for parts, both ways	Life of product	IAI for first year, Sys thereafter	702-795-7687 (1 year)	Yes	30-day	7-30 days, 15%
	48 hours	Return only	1 year	Taquara	N/A	No	30-day	After 30 days, 25%
	48 hours	Return only	Life of product	Tangent	N/A	OS only	30-day	None
	48 hours	Return only	1 year	TigerDirect	888-777-6200	No	None	None
Year	48 hours	Return only	3 years	Toshiba	800-457-7777	Yes	Varies	Varies
	72 hours	Return only	Life of product	Total	N/A	OS only	30-day	Up to 15%
	24 hours	Return only	Life of product	Unicent	N/A	Yes (30 days)	30-day	None
	48 hours	Return only	Life of product	Unitek	N/A	No	30-day	15%
Year	72 hours	First 30 days, both ways; return only thereafter	Life of product	Xi	N/A	Yes (30 days)	30-day	None
	72 hours	Return only	Life of product	Zenon	N/A	Yes	30-day	After 30 days, 20%

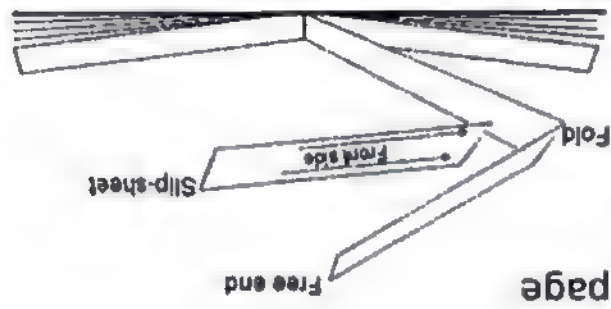
1. Open the foldout page
2. Insert this sheet with

1. Front side touching the free page

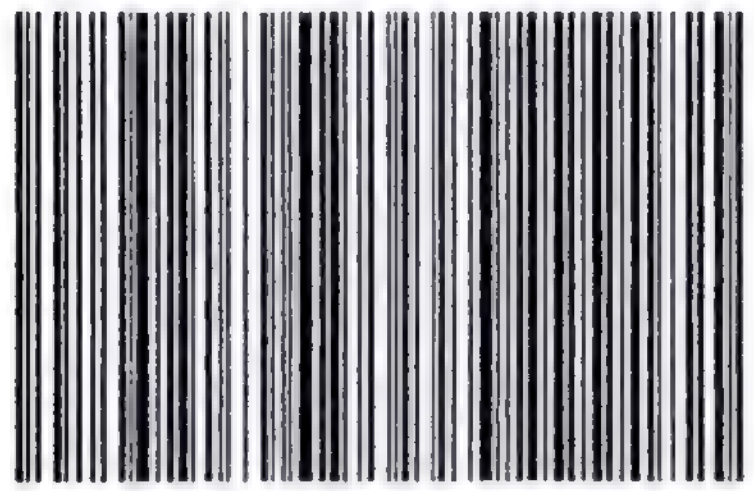
2. Arrow pointing to the fold

3. Slice the folded edge

4. Close the page and slip-sheet



Inverted Foldout slip-sheet



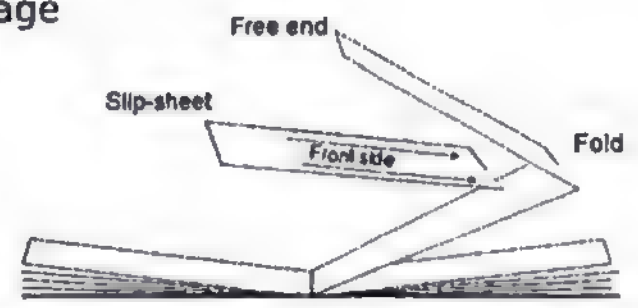
GbsSlipSheet-001



Foldout slip-sheet

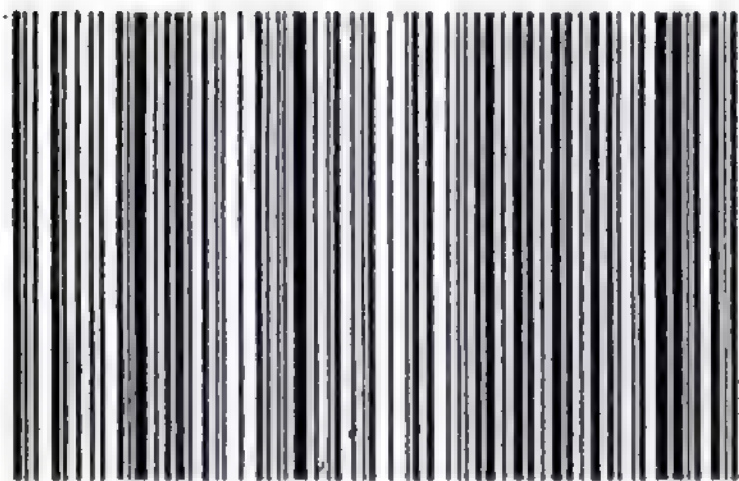
Folded edge of the page

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



GbsSlpBack-001B

Back

1. Follow instructions on the other side

YOU'RE GONNA FIT 64 MB OF RAM AND A 4.3 GIG HD WHERE?



THE VAIO® 505 SUPERSLIM NOTEBOOK. UNDER 3 LBS. AND LESS THAN 1" THIN.

Where there's a will, there's a Sony design team. Their latest achievement wouldn't be so extraordinary if it weren't so powerful and so light. Inside its tough magnesium-alloy case, you'll find some notable innovations. The **Programmable Power Key** short-cuts you to most-used functions like e-mail or browsers without having to close down the file you're in. **i.LINK™** gives you a port for capturing digital video. And **Signature Capture** lets you add your John Hancock to original works or documents. What else do you need to seal the deal—how about an Intel® Pentium® processor with MMX™ technology 266 MHz?



Service and Support: How the Vendors Compare

ACMA, American Multisystems, Comtrade, and Duracom chose not to send information

Company	Tech-support phone	Tech-support hours (eastern time)	Warranty on parts/labor (years)	Standard on-site service for 1 year	Local depot service handled by	Average number of employees in vendor's service center	On-site service provider	Cost of 4-h response
Aberdeen (CA)	800-552-6888	11:00-8:00 M-F	1/1	None	Aberdeen	10	N/A	N/A
Acer (CA)	800-445-6495	24 hours, 7 days	3/1	Included	Authorized providers	N/A	Dow Jones, TSS	N/A
ACT (CA)	800-775-1953	Noon-8:00 M-F	1/1	\$99	ACT	8-10	IAI	\$128 for 1 yr
Axis (CA)	800-378-9014	24 hours, 7 days	3/3	Included	Axis	40	Micro Warranty Services	N/A
Compaq (TX)	800-652-6672	24 hours, 7 days	3/1	Included	Compaq	3-5	Compaq, authorized providers	For 3 years: \$77 (7 days) or \$34
CompUSA (TX)	888-226-6772	24 hours, 7 days	3/1	Included	Local CompUSA	5 per center	CompUSA, Tech Force	N/A
CyberMax (PA)	800-291-9869	24 hours, 7 days	3/1	Included	CyberMax	80	Tri-State, VanStar	N/A
DMI (OH)	800-275-5700	8:30-8:00 M-F	3/3	None	DMI	6	N/A	N/A
Dell [Dimension] (TX)	800-624-9896	24 hours, 7 days	3/1	Included	N/A	N/A	BancTec	N/A
Dell [OptiPlex] (TX)	800-624-9896	24 hours, 7 days	3/3	Included (3 years)	N/A	N/A	BancTec, Unisys, Wang Global, authorized providers	N/A
DTK (CA)	800-289-2385	8:30-5:30 M-F (all time zones)	2/2	\$50	DTK	5-50	DTK, authorized providers	N/A
Gateway (SD)	800-846-2301	24 hours, 7 days	3/3	Included	Gateway	N/A	TSS	N/A
GST/MicroCity (CA)	800-670-2764	Noon-8:30 M-F	1-3/1-3	Varies by model	GST	28	GST, ITT/DFS	N/A
Hertz (NY)	888-222-7280	8:30-5:30 M-F	3/1	Included	Hertz	5	Digital	N/A
HP (CA)	870-635-1000	8:30-8:30 M-F	3/1	Included	HP, authorized providers	N/A	HP, authorized providers	Varies
Highwave (CA)	408-432-3899	Noon-9:00 M-F	3/3	\$65	Highwave	12	NWC	N/A
HiQ (CA)	800-827-5836	8:00 A.M.-9:00 P.M. M-F, 11:00-5:00 Sat	3/1	\$35	HiQ	80 in 7 locations	HiQ, Micro-Age	\$299 for 1 yr
IBM (NC)	800-772-2227	24 hours, 7 days	3/1	Included	Authorized providers	N/A	IBM, authorized providers	Varies
Initiative (TX)	800-999-1413	9:00-6:00 M-F	1/1	\$35	ITI	8	Source One	N/A
Kingdom (PA)	800-385-3437	8:30 A.M.-9:00 P.M. M-F, 10:00-6:00 Sat	3-5/1	Included	Kingdom	100	GE, Philips, US Net	\$500 per inci
Maximus (CA)	800-699-0142	Noon-9:00 M-F, 1:00-8:00 Sat	3/1	None	N/A	N/A	N/A	N/A
Mega (CA)	800-338-6628	11:00-8:00 M-F	2/2	\$65 (local only)	Mega	3	Authorized providers	\$100 for 1 yr
Micro Express (CA)	800-762-3378	24 hours, 7 days	4/4	\$50	Micro Express	20	GE	N/A
Micron (ID)	888-349-6972	24 hours, 7 days	3-5/1	Included	Micron	150-300	Unisys	Varies
MidWest Micro (OH)	800-262-6622	24 hours, 7 days	3-5/3-5	Included	MidWest Micro	Info not available	Decision One	N/A
NEC (CA)	800-632-4525	24 hours, 7 days	3/3	Included	NEC, authorized providers	80	NEC UltraCare Partners	N/A
NETIS (CA)	408-263-0368	Noon-8:00 M-F	1/1	\$75	NETIS	20	Tagram, NWC	N/A
nextPC (CA)	800-367-7794	24 hours, 7 days	3/3	Included	nextPC	7	IAI	N/A
NexTrend (CA)	800-367-7794	24 hours, 7 days	3/3	Included	NexTrend	7	IAI	N/A
Polywell (CA)	800-300-7659 ¹ , 800-367-7794 ²	11:00-9:00 M-F ¹ ; 24 hours, 7 days ²	3/5	\$75	Polywell	20	IAI	\$200 for 1 yr
Premio (CA)	800-568-6388	11:00-8:00 M-F	3/1	Included	Premio	10	Decision One, US Net	N/A
ProGen (CA)	888-777-5501	9:00-9:00 M-F	3/1	Included	ProGen	25	US Net	N/A
Quantex (NJ)	800-864-8650	24 hours, 7 days	3/1	Included	Quantex or third party ³	15-20	Philips, VanStar ³	TBA ⁴
Racer (AZ)	800-454-9713	24 hours, 7 days	3/lifetime	Included	Racer	30	Authorized providers	N/A
Reason (MN)	800-800-4860	9:00-7:00 M-F, 10:00-5:00 Sat	6/3-6	\$49 (2 years included, local only)	Reason	10	Reason, NWC (extra cost)	N/A
Royal (CA)	800-486-2708	Noon-9:00 M-F, noon-7:00 Sat	1/1	\$130 (2 years)	Royal	15	Service Net	N/A
SAG (MA)	800-899-5752	8:30 A.M.-9:00 P.M. M-Sat	3/1	Included	SAG	5	BancTec	\$200 for 1 yr
Sys (CA)	800-613-9963 x123 ¹ , 800-367-7794 ²	Noon-9:00 M-F ¹ ; 24 hours, 7 days ²	1-6/5	Included	Sys	4	IAI	\$125 per visi
Tagram (CA)	800-443-5761	Noon-9:00 M-F ⁴	3/1	\$45	Tagram	10	TBA	N/A
Tangent (CA)	800-399-8324	9:00-9:00 M-F	3 (PC only)/3	Included	Tangent	15	Tangent, IBM, TSS	N/A
TigerDirect (FL)	888-777-6200	7:30-11:00 M-F, 9:00-6:00 Sat	1/1	Included	Tiger	10	Decision One	N/A
Toshiba (CA)	800-867-4422	24 hours, 7 days	3/1	Included	Unisys, authorized providers	Info not available	Unisys, authorized providers	N/A
Total (MA)	508-393-0306	9:00-8:00 M-F (all time zones)	3/1	Included	Total	30 in 6 locations	Decision One	Varies
Unicent (OH)	800-731-6182	24 hours, 7 days	3/1	Included	Unicent	10	US Net	Varies
Unitek (CA)	809-930-5700	8:00-6:00 M-F, 10:00-3:00 Sat	1/1	\$89	Unitek	5	NWC	Varies
Xi (CA)	800-432-0486	24 hours, 7 days	3/3	Included	Xi	24	NWC	N/A
Zenon (CA)	800-229-7898	10:00-10:00 M-F, 1:00-6:00 Sat	1/1	\$99	Zenon	10	Service Net	N/A

N/A—Not applicable. The company does not offer this service. (1) In-house, lifetime. (2) Third-party, free for 1 year. (3) The vendor was determining new policies at press time. (4) 24-hour, 7-day service expected by e

SONY

PCG-503FX

- Intel Pentium processor with MMX technology 266 MHz
- 10.4" Active Matrix SVGA Display (800 x 600 resolution)
- 64 MB SDRAM (expandable to 96 MB)
- 4.3 GB hard drive
- V.90 modem
- 128-bit graphics accelerator
- Windows® 98 pre-installed
- Programmable power key
- Touch pad with pen operation
- i.LINK (IEEE-1394) port for digital video still image capture 
- Price includes accessories: AC adapter, rechargeable battery, floppy disk drive, port replicator

\$2,199⁹⁹ Monthly payments as low as \$40.30*

PCG-503F

- Intel Pentium processor with MMX technology 233 MHz
- 10.4" Active Matrix SVGA Display (800 x 600 resolution)
- 32 MB SDRAM (expandable to 96 MB)
- 4.3 GB hard drive
- V.90 modem
- 128-bit graphics accelerator
- Windows 98 pre-installed
- Programmable power key
- Touch pad with pen operation
- Price includes accessories: AC adapter, rechargeable battery, floppy disk drive, port replicator

\$1,899⁹⁹ Monthly payments as low as \$34.80*

convergence

DEFINED BY SONY.
REFINED FOR YOU



The Sony IC Chip Recorder

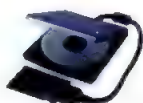
Welcome to Sony VAIO, pronounced like Ohio. It's where video, audio and computing converge into stunning digital integration. Because Sony VAIO Notebooks are designed to work with the ever-expanding line of Sony audio/video products.

Take the ingenious Sony IC Chip Recorder. This palm-sized device (2.5 oz.) records voices with digital clarity. Record important meetings. Download, save and e-mail voice messages and memos using your Sony VAIO Notebook. Holds up to 24 minutes of recordings.

ICD-70PC: \$199.95

OPTIONAL ACCESSORIES

CD-ROM drive



Slim, color-coordinated 14X CD-ROM drive for serious multi-media capability. Or listen to CDs with headphones.

PCGA-CD: \$299.99

Stereo speakers



Just clip these speakers on both sides of the display panel for enhanced sound performance.

PCGA-SP5: \$99.99

Rechargeable battery pack (LG)



Double the time you can spend on your SuperSlim Notebook with this double capacity Lithium-Ion battery.

PCGA-BP52: \$299.99

AC adapter



Just plug it into your VAIO 505 SuperSlim Notebook and forget all your concerns about battery life.

PCGA-AC51: \$99.99

USE THE SONY CITIBANK® PLATINUM SELECT™ CARD AND GET TRIPLE SONY POINTS TOWARDS SONY MOVIES, MUSIC, ELECTRONICS AND GAMES.



Sony Card

ORDER IT DIRECT FROM SONY

www.sony.com/vaiodirect-go505

OR

1-877-244-9961

TOLL FREE

Sony VAIO Direct™
Great Products. Great People.

VISIT THE SONY BOOTH AT COMDEX

© 1998 Sony Electronics Inc. All rights reserved. Reproduction in whole or in part without written permission is prohibited. Prices and specifications are valid only in the U.S. and are subject to change without notice. Prices do not include applicable sales tax or shipping. Sony VAIO, Great Products, Great People, i.LINK and the Sony logo are trademarks of Sony. Sony VAIO Direct is a service mark of Sony. Windows is a registered trademark of Microsoft Corporation. Intel, the Intel Inside logo and Pentium are registered trademarks and MMX is a trademark of Intel Corporation. Citibank is a registered trademark of Citicorp. Citibank Platinum Select is a service mark of Citicorp. All other trademarks are trademarks of their respective owners. *Sony Computer Loan terms: No money down. 15.69% ANNUAL PERCENTAGE RATE (APR) and 12.85% variable rate (8.25% Prime + 4.60% Spread), as of October 6, 1998, each subject to monthly increase. The monthly variable rate equals the prime rate published in the "Money Rates" table of The Wall Street Journal on the 1st business day of each month. Changes to rate take effect on the 5th business day of each month and remain in effect until subsequently changed. Eight-year term. On approved credit. The Sony Computer Loan is offered by Servus Financial Corp.

SONY

VAIO PCV-E308DS

\$2,299.99 As low as \$42.13 a month*

- Intel® Pentium® II processor 450 MHz
- 128 MB SDRAM (expandable to 256 MB)
- 13.6 GB hard drive
- 5X DVD-ROM/24X CD-ROM (max. performance)
- i.LINK (IEEE-1394), Optical Digital Audio Out, and S-Link technology (Control A-1)
- Front accessible i.LINK (IEEE-1394), and USB connectors
- 2X AGP 3D graphics hardware acceleration (Matrox G200)
- 8 MB video memory (SDRAM)
- Dynamic high-fidelity 3D PCI audio
- V.90 compatible modem



VAIO PCV-E302DS

\$1,499.99 As low as \$27.47 a month*

- Intel Pentium II processor 350 MHz
- 64 MB SDRAM (expandable to 256 MB)
- 10.2 GB hard drive
- 5X DVD-ROM/24X CD-ROM (max. performance)
- i.LINK (IEEE-1394), Optical Digital Audio Out, and S-Link technology (Control A-1)
- Front accessible i.LINK (IEEE-1394), and USB connectors
- 2X AGP 3D graphics hardware acceleration (Matrox G200)
- 8 MB video memory (SDRAM)
- Dynamic high-fidelity 3D PCI audio
- V.90 compatible modem

INSTALLED SOFTWARE

Sony Original Software

- **Picture Gear™**—Organize your digital images and stitch them together seamlessly to create a perfect panorama.
- **DVgate™ Still**—Captures high-quality still images from video and stores them in BMP, JPEG, GIF or DVF format.
- **DVgate Motion**—Sony's digital video editing software that allows you to transfer and edit digital video from Sony's Digital Handycam Camcorder to your PC via i.LINK (IEEE-1394) technology.

- **Digital Media Park Software™**— Gives you an easy way to manage and make your own customized MiniDisc recordings.

Pre-installed Software

- Microsoft® Windows® 98
- Adobe® PhotoDeluxe®
- Adobe Premier LE
- Microsoft Works 4.5
- Intuit® Quicken® Basic 7.0
- Microsoft Encarta® 98
- Microsoft Money 98
- Gremlin Interactive MotorHead®

convergence

DEFINED BY SONY.
REFINED FOR YOU.



The Sony Digital Mavica® Camera

Welcome to Sony VAIO®, pronounced like Ohio. It's where video, audio and computing converge into stunning digital integration. Because Sony VAIO Digital Studio PCs are designed to work with the ever-expanding line of Sony audio/video products.

Take the sleek Sony Digital Mavica Camera (MVC-FD81), the world's only camera that uses a floppy disk as film. Add images or capture short MPEG-1 videos for multi-media presentations on your Sony VAIO PC, then e-mail them or post them to the Internet. The Mavica Camera even has a built-in microphone and speaker so you can voice-memo your shots.

MVC-FD81: \$799.00

ORDER IT DIRECT FROM SONY

www.sony.com/vaiodirect-buyDS

OR

1 - 8 7 7 - 2 4 4 - 9 9 6 1

TOLL
FREE

Sony VAIO Direct™

Great Products. Great People.

Use the Sony Citibank® Platinum Select™ Card with any purchase and get triple Sony points towards Sony movies, music, electronics and games. Apply today.



Sony Card

VISIT THE SONY BOOTH AT COMDEX

© 1998 Sony Electronics Inc. All rights reserved. Reproduction in whole or in part without written permission is prohibited. Prices and specifications are valid only in the U.S. and are subject to change without notice. Prices do not include applicable sales tax or shipping. Sony, Trinitron, VAIO, Digital Studio, Great Products, Great People, i.LINK, S-Link, Picture Gear, DVgate, Handycam, Digital Media Park Software, Mavica and the Sony logo are trademarks of Sony. Sony VAIO Direct is a service mark of Sony. Microsoft, Windows and Encarta are registered trademarks of Microsoft Corporation. Intel, the Intel Inside logo and Pentium are registered trademarks of Intel Corporation. Citibank is a registered trademark of Citicorp. Citibank Platinum Select is a service mark of Citicorp. All other trademarks are trademarks of their respective owners. *Sony Computer Loan terms: No money down, 15.69% ANNUAL PERCENTAGE RATE (APR) and 12.85% variable rate (8.25% Prime + 4.60% Spread) as of October 6, 1998, each subject to monthly increase. Eight-year term. On approved credit. The Sony Computer Loan is offered by Servus Financial Corp. Subject to product availability and carrier pick-up. Delivery options include overnight service, two-day delivery, or ground service. For Hawaii and Alaska: two-day delivery only. Shipping charges to and from the customer are not refundable.

1. Open the foldout page

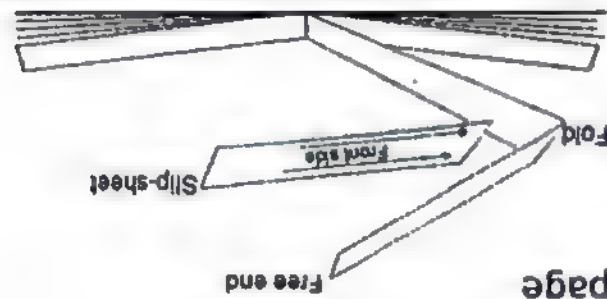
2. Insert this sheet with

1. Front side touching the free page

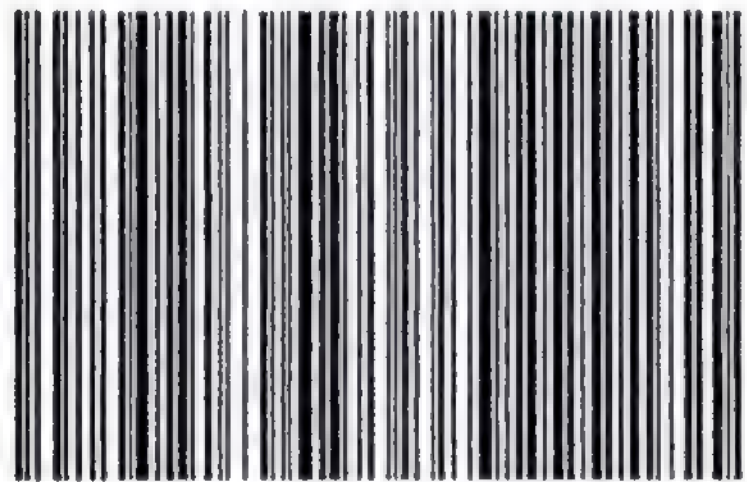
2. Arrow pointing to the fold

3. Slice the folded edge

4. Close the page and slip-sheet



Inverted Foldout slip-sheet



GbsSlipSheet-001

Folded edge of the page

Foldout slip-sheet

1. Open the foldout page

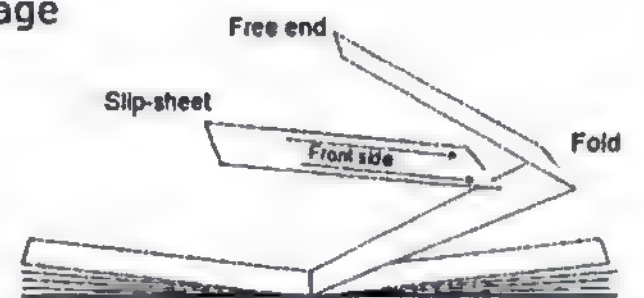
2. Insert this sheet with

1. Front side touching the free page

2. Arrow pointing to the fold

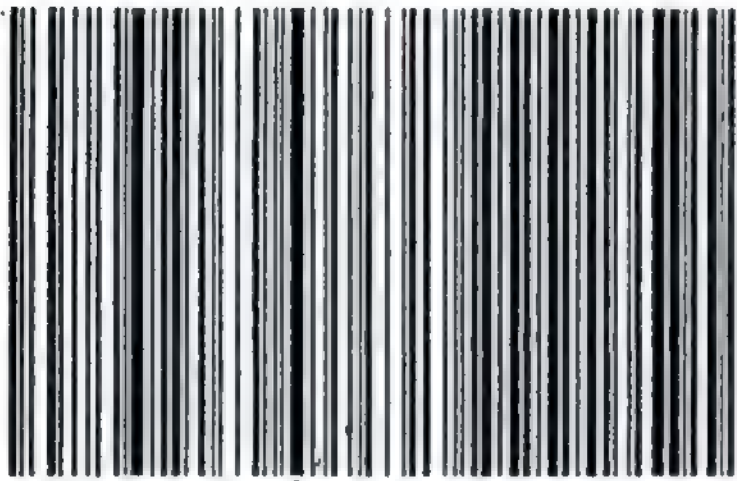
3. Slice the folded edge

4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



GbsSlpBack-0018

Back

1. Follow instructions on the other side

DON'T JUST DABBLE

IN THE DIGITAL AGE.



DOMINATE IT.

Tired of dilly-dabbling with the average computer? Then get a Sony VAIO Digital Studio™ PC, and discover how amazing the convergence of audio, video and computing can be. A powerhouse of a PC, it will help you do things you never thought possible. Like import digital video from your Sony Digital Handycam® Camcorder Straight to your PC via iLINK™ technology. Edit in titles, transitions or soundtracks to create your own movies and presentations. You can even use your PC to control Sony MiniDisc Decks and CD changers, creating customized MiniDiscs with synchronized recording. Thanks to Sony S-Link™ and Optical Digital Audio Out technologies. All with ease. And all with the remarkable sound and visual quality that only the Sony VAIO Digital Studio Series can deliver. Of course, if you're in the mood to dabble, just put your feet up and pop in your favorite DVD title.



The Sony Trinitron™ Multimedia Display depicted in this ad is sold separately.

Beware:
Longer
warranties
don't
always
cover all
parts.

more personalized treatment, and several offer longer warranties than the big players. Companies such as Micro Express give you warranties of four years for parts and labor. Racer Computer covers labor for the life of the product; Reason Computer covers its offerings for six years, and Polywell for five. Other vendors give you parts or labor coverage for up to five years, but only for select parts—often the CPU and RAM. In some cases, companies will offer you a limited warranty for a long period of time such as six years, but after the first two or three, you'll begin paying 20 percent of repair costs, then graduate to 40 percent or more until the warranty expires.

Round-the-clock tech support can also be deceptive. Some smaller companies offer live technicians during business hours, then forward calls to a pager after hours. Others that offer 24-hour, 7-day support for a limited time may

require you to leave a message after hours; they verify your warranty and call you back.

DO IT YOURSELF

To combat rising costs, vendors are beefing up their Web sites or including customized diagnostics programs either online or on the system itself. Most vendors offer you FAQs, drivers, and perhaps system-line-specific documentation. IBM has gone beyond that and has set up a secured section of its Web site, where you can set up a personal Web page and access IBM's Knowledge Base to run diagnostics on your system and store that data for your use, a technician's use, or your IS manager's use. These programs help to a certain degree, walking you through common problems—provided your system is healthy enough to allow you to use them. Always keep your tech-support numbers handy and make sure you get paper manuals.

CONSULTING SERVICES

For some of the largest PC vendors, hardware is just the beginning of their product offerings.

Three of the computer industry's heavyweights—Compaq, Hewlett-Packard, and IBM—go beyond warranties and technical support to offer you well-developed consulting services in diverse areas. Recently, they've even added Y2K services, going in to help assess problems and develop plans for coping with imminent Y2K issues. These services cost you anywhere from tens of thousands of dollars to even millions. You get what you pay for, and you can get almost anything you want.

WHAT DO THEY REALLY DO?

With thousands of employees devoted solely to consulting tasks, all three companies offer you comprehensive and individual services. Among other services, they'll send their consultants in, assess your IT department, help you set up or improve your help desk services, manage transitions to new tech-

nologies, help you evaluate your need for a managed network of systems, and then implement custom and third-party solutions to take care of your needs. The consultants will look over your company and see what kind of risks you have on Y2K issues, help you come up with a plan to resolve what you can, and minimize the damage from what you can't. They can set up training programs for new employees or arrange shorter seminars. They can come in and look over your internal communications and help make it more efficient; Compaq and HP focus on a Microsoft Exchange solution for messaging services, although all three will also help with other packages.

All three have special sections that deal specifically with the needs of financial institutions, helping with everything from electronic banking to customer service.

Without a doubt, IBM has the

longest-running program and is the one with the widest global reach. Compaq comes close, especially with its recent acquisition of Digital—and thus Digital's excellent consulting organization. To top that off, Compaq also has Tandem, a company that offers some of the same level of service that Digital has, but with somewhat greater emphasis on non-PC architectures. Compaq is in the process of fully integrating all services. HP's services are as wide-ranging as the others, but it doesn't quite have the numbers that Compaq and IBM do.

AND DELL?

Dell has stepped into the top tier of computer sellers recently and offers some of these services directly, but the programs are nowhere near as broad. You can get augmented and specialized warranty coverage, customized preloads on systems, and help with deployment of servers, systems, and networking hardware, but that's where Dell stops—at least for now. Dell does, however, augment its own services by partnering with companies such as Wang and Unisys.—AY

**Shotguns have always
had a way of
hurrying things along.**

**(Now, they're
doubling your
modem speed too.)**

MODEM SPEEDS TO 112K! THE FASTEST ACCESS OVER ORDINARY PHONE LINES.

**SHOT
GUN**

Feeling the pressure to move faster in today's world? Try the SupraSonic II with Shotgun Technology—the innovative new modem that delivers Internet access up to 112K. Diamond's exclusive Shotgun technology delivers a double barrel of bandwidth by combining two 56K modems on a single board. So you can get the fastest dial-up speeds available using two ordinary phone lines. Plus, the SupraSonic II includes intelligent software that maintains a reliable connection even while releasing your second phone line for incoming calls or faxes. Diamond has integrated the V.90 standard and Rockwell K56flex technology for superior compatibility and performance. And now



Rockwell

Shotgun 112K Technology is supported nationwide by leading Internet providers in over 2,000 cities, including popular ISPs like NetCom. So look for the Shotgun logo when buying a modem, and start getting speeds up to 112K today.



**SUPPORTED NATIONWIDE
BY INTERNET PROVIDERS
IN OVER 2,000 CITIES.**

**DIAMOND
MULTIMEDIA**

Enter the Shotgun Sweepstakes at
<http://www.diamondmm.com/shotgun>

Although these modem/modem technologies are capable of 56Kbps/112Kbps download performance, line impairments, public telephone infrastructure and other external technological factors currently prevent maximum 56Kbps/112Kbps connections. © 1998 Diamond Multimedia Systems, Inc. All rights reserved. Diamond, the Diamond logo, and SupraSonic are registered trademarks of Diamond Multimedia Systems, Inc. SupraExpress, the Shotgun Technology logo, and Shotgun are trademarks of Diamond Multimedia Systems, Inc. Rockwell and the Rockwell logo are trademarks of Rockwell International. All other trademarks or registered trademarks are the property of their respective owners.

Price/Performance Index

HIGH-END

The Compaq Deskpro EN 450, one of our Editors' Choices, provides Compaq's Intelligent Manageability, a package that affords excellent management features, including the ability to remotely lock the case, all for \$2,670. The system performed well and is so easy to service that replacing drives is a tool-free job.

Our other Editors' Choice, the HP Vectra VL Series 8 HE, is among this chart's top group. At \$2,950, the tool-free HP is an administrator's dream: HP's own TopTools offers all the management features you need right out of the box. The Vectra VL was an excellent performer on most of our tests.

The Dell OptiPlex GX1p, \$2,942, offers many features to make an IS manager's job easier, including a lockable case that opens easily, swing-away power supplies, intrusion detectors, and support for remote BIOS updates. The unit was an average performer.

The \$2,797 Micron ClientPro 450 performs well and has a thorough implementation of LANdesk 3.3. The \$2,770 IBM 300PL (450) comes in an easy-to-service, tool-free case. The system also offers IBM's package of excellent management tools.

Dell, HP, and IBM all received top marks across our Reader Service and Reliability survey.

MAINSTREAM

The \$1,670 Compaq Deskpro EN 350, the Editors' Choice \$1,680 HP Vectra VE Series 8, the \$2,100 IBM PC 300PL, and the \$2,136 Dell OptiPlex GX1, all offer excellent manageability and serviceability, which includes lockable, tool-free cases, intrusion detectors, and complete management software. All four systems were good performers, posting average to above-average scores on our tests.

The \$1,799 MidWest Micro Business Solutions WKP-350 and the \$2,073 NEC PowerMate 8000 offer good expansion and tool-free cases. The NEC posted great test results and was a good network citizen as well; the MidWest Micro system offers good but limited LANdesk functionality. The \$1,099 Axis Metropolis NX5 300 is a great value for small or medium-sized networks.

Ratings

Top-rated PCs in the Management category have all the standard inventory capabilities as well as remote hardware monitoring, chassis intrusion alarms, remote BIOS updates, remote component locking, and Wake-on-LAN capabilities. Systems that scored well on our Business Winstone 99 and CD-ROM WinMark 99 tests earned excellent ratings on the Performance measure. *Excellent* systems in the Upgradability/Serviceability category have free bays and slots, as well as tool-free chassis, tool-free drive bays, large power supplies, free IRQs, and more. To rate *excellent* in the Service category, systems must have around-the-clock technical support and offer it for the life of the product; have long warranties, pay for shipping both ways in case of repair, and include on-site service standard among other things. Possible ratings are *excellent*, *good*, *fair*, and *poor*. (See page 156.)

HIGH-END PERFORMANCE/FEATURES



MAINSTREAM PERFORMANCE/FEATURES



THIS IS A PROFESSIONAL PHOTO LAB.
IT PRINTS SUPER CLEAR, SHARP PHOTOS.
TOTAL COST: \$127,000.



THIS IS THE HP PHOTOSMART
DIGITAL PHOTOGRAPHY SYSTEM.
IT PRINTS SUPER CLEAR, SHARP
PHOTOS. TOTAL COST: \$127,000
(HOUSE INCLUDED).

The HP PhotoSmart photo scanner & photo printer let you print amazingly crisp, clear pictures at home. No waiting in line or wondering if the clerk will reprint frame 24 instead of 24A. To start, the 30-bit scanner happily scans slides or negatives at 2400 dpi and photos at 300 dpi. It then zips them into your PC where you can repair old photos, add text or special effects, even remove that mildly unnerving red eye. Next, at the push of a button, the printer produces sharp, vibrant images that look and feel like real photos. Speaking of which, the HP PhotoSmart system can handle a variety of paper sizes and finishes, and produces enlargements and reprints in just minutes. You also get Microsoft® Picture It!™ photo-enhancing software. As well as a terrific break on price: the scanner is just **\$299** and the printer **\$199** after our mail-in rebate.* Real photos at home without having to take out a second mortgage. The HP PhotoSmart system. Get the picture.

SAVE UP TO \$200

WHEN YOU BUY AN HP PHOTOSMART PHOTO PRINTER AND/OR PHOTO SCANNER.

NAME _____	
ADDRESS _____	APT. _____
CITY _____	STATE _____ ZIP _____
CHECK ONE ☐ \$200 REBATE—HP PHOTOSMART PHOTO PRINTER AND PHOTO SCANNER	
☐ \$100 REBATE—PHOTOSMART PHOTO PRINTER ☐ \$100 REBATE—PHOTOSMART PHOTO SCANNER	
PRODUCT SERIAL NUMBER(S) _____	

I have read, understood and complied with all the terms and conditions of this offer.

SIGNATURE _____	DATE _____
-----------------	------------

TO RECEIVE YOUR REBATE(S)

Purchase: An HP PhotoSmart photo printer and/or photo scanner between 7/12/98 and 1/31/99.
Submit: 1) This mail-in certificate including HP product serial number(s); 2) The actual product UPC/barcode(s) from the box; and 3) An original or copy of store-identified receipt(s) dated between 7/12/98 and 1/31/99 for either of the HP products specified, with purchase price(s) circled. Mail to: HP PhotoSmart Rebates, P.O. Box 7281, Mankato, MN 56006-7281. Envelope containing this coupon and your store receipt must be received by 3/1/99. Any claims received after this date will be returned as ineligible.
Receive: A \$100 rebate for printer and/or \$100 rebate for scanner.

Offer good from 7/12/98 through 1/31/99. Purchases before or after these dates are not eligible for this offer. Purchase date is determined by invoice or receipt date. Allow 7-8 weeks for processing. Incomplete or illegible submissions will be returned. Keep copies of materials submitted; originals submitted become Hewlett-Packard ©HP property and will not be returned. Limit one rebate per product purchased. HP reserves the right to request additional information regarding this claim, and the right to confirm identification. False information disqualifies this claim, making it subject to review under U.S. Postal Regulations. Violators may be prosecuted. Offer not valid with any other HP offer. Offer not valid on refurbished HP products. Only purchases made from an authorized HP reseller in the 50 United States, its territories, and Canada are valid. *Terms and conditions are not met, rebate will not be sent. Void where prohibited, taxed or restricted by law. HP is not responsible for lost, damaged or delayed claims. If you have any questions, please call the HP PhotoSmart Awards Center at 1-888-HP4-FUNPICS from 7 am to 6:30 pm CST, Monday through Friday.



1-888-HP4-FUNPICS *Scanner price before rebate \$399. Printer price before rebate \$299. (Average street prices.) Void in CT and ME. www.photosmart.com
©1998 Hewlett-Packard Company. HP and Hewlett-Packard are registered trademarks of the Hewlett-Packard Company. Microsoft and Picture It! are trademarks or registered trademarks of Microsoft Corporation.

Ratings

	Manageability	Serviceability/ upgradability	Performance	Service offerings
HIGH-END				
AcerPower 8000	Poor	Good	Good	Good
ACMA nPower 6400	Poor	Good	Good	Good
ACT Brillianta P6II-400HC	Poor	Fair	Good	Fair
Axis Metropolis GX5 400	Good	Fair	Good	Excellent
Compaq Deskpro EN 450	Excellent	Good	Good	Excellent
Comtrade Professional 400	Poor	Fair	Fair	Fair
Dell OptiPlex GX1p	Excellent	Good	Good	Excellent
DTK APRI-80M/P350	Good	Fair	Good	Good
Duracom ProForma 6301	Poor	Fair	Good	Good
Gateway E-4200 450	Good	Good	Good	Excellent
GST Celestial Storm 400N	Fair	Good	Good	Good
HP Vectra VL Series 8 HE	Excellent	Good	Excellent	Good
Highwave Scorpion 400	Poor	Fair	Good	Fair
HiQ Impact Pro	Good	Fair	Excellent	Good
IBM PC 300PL (450 MHz)	Excellent	Good	Excellent	Good
Maximus Powerman Workstation	Poor	Fair	Good	Good
Mega Impact PII 400 128MX	Fair	Fair	Good	Good
Micron ClientPro 450	Excellent	Good	Fair	Excellent
MidWest Micro Business Solutions WKP-450	Fair	Good	Good	Excellent
NEC PowerMate 8100	Excellent	Fair	Good	Good
NexTrend NexStar-450MP	Good	Fair	Excellent	Good
Polywell Poly 800B5	Poor	Good	Good	Good
ProGen Polaris PII 450	Good	Fair	Good	Good
Quantex QP6/450 SB-5	Good	Good	Good	Excellent
Reason Square 1 BX/A	Good	Good	Good	Good
Royal Power Desktop	Poor	Fair	Good	Good
SAG STA Dual Power System 400	Fair	Fair	Good	Good
Sys Performance Pro 450	Good	Good	Excellent	Excellent
Tagram Platinum T5700	Poor	Good	Good	Good
Tangent Medallion BX 400	Good	Good	Good	Good
Toshiba Equium 7100D	Good	Good	Good	Good
Xi 400 MTower SP	Good	Good	Good	Good
MAINSTREAM				
ACMA nPower 6333	Poor	Good	Fair	Good
ACT Brillianta P6II-400MC	Poor	Fair	Fair	Fair
Axis Metropolis NX5 300	Good	Fair	Poor	Excellent
Compaq Deskpro EN 350	Excellent	Good	Fair	Excellent
Dell OptiPlex GX1	Excellent	Good	Fair	Excellent
DTK APRI-80M/P266	Good	Good	Poor	Good
Duracom ProForma 6221	Good	Fair	Fair	Good
Gateway E-3200 400	Good	Good	Fair	Excellent
GST Celestial Storm 333N	Fair	Good	Fair	Good
HP Vectra VE Series 8	Excellent	Good	Fair	Good
Highwave Tercel 300	Poor	Fair	Poor	Fair
HiQ Impact Elite	Good	Fair	Fair	Good
IBM PC 300PL (400 MHz)	Excellent	Good	Fair	Good
Maximus Executive Workstation	Poor	Fair	Fair	Good
Mega Impact PII 333 64MX	Fair	Fair	Fair	Good
Micron ClientPro 350	Good	Fair	Excellent	Excellent
MidWest Micro Business Solutions WKP-350	Fair	Fair	Fair	Excellent
NEC PowerMate Enterprise 8000	Excellent	Fair	Fair	Good
ProGen Polaris PII 350	Good	Fair	Fair	Good
Quantex QP6/350 SB-3	Poor	Good	Fair	Excellent
Reason Square 6 BX/JN	Fair	Good	Fair	Good
SAG STA Dual Power System 300	Fair	Fair	Fair	Good
Sys Performance Pro 400BA	Poor	Fair	Fair	Excellent
Tagram Platinum T5300	Poor	Good	Fair	Good
Tangent Medallion BX 300	Poor	Excellent	Poor	Good
Toshiba Equium 7000S	Good	Good	Fair	Good
Total Peripherals Serengeti BX350	Poor	Fair	Fair	Good
Unicent Avanta L300	Fair	Excellent	Fair	Good
Xi 400 MTower CSP	Fair	Good	Fair	Good
Zenon Z-Corp	Poor	Fair	Fair	Good

but easily upgraded and repaired as well. Out of 62 systems, 28 have chassis that can be opened without tools. Many also offer drives that can be replaced without tools, motherboards that slide out for servicing, and riser cards that pop out for easy access to interior components. The best chassis designs are typically offered by the largest manufacturers: Compaq, Dell, Gateway, HP, NEC, and a handful of others.

The simplest and most effective system upgrade is typically the addition of memory modules. Most PCs reviewed here integrate at least three DIMM slots, allowing you to install 384MB of SDRAM (using 128MB DIMMs, with all 256MB DIMMs capacity is 768MB). But the two Toshibas, the mainstream Compaq, the high-end Polywell, the Zenon, and the mainstream HiQ have but two slots. Whether a machine has two or three slots, it should ship to you with only one slot filled. If two out of two or two out of three are filled, you'll have to discard one of the existing memory modules if you upgrade to the machine's maximum memory size.

You'll also need a modicum of bus slots and drive bays in case you have to install new peripherals in the future. All systems offer at least one open ISA slot, which may still be needed for legacy hardware but is quickly moving toward obsolescence. Nine systems offer only one available PCI slot, but all others offer at least two, and most offer many more.

A corporate PC doesn't need scads of open drive bays, but it should have at least one. In this roundup, Compaq's mainstream PC and Tagram's mainstream unit lack an open bay. Yet the former machine is perhaps the smallest full PC on the market, a good option for those with little office room.

VENDOR SERVICE AND SUPPORT

When unable to repair a system, you need help from the manufacturer. The best resource for determining the efficacy of a company's support procedures is our annual Service and Reliability Survey (*PC Magazine*, July 1998), in which our readers rate the top 25 manufacturers. This year, three vendors reviewed here—Dell, HP, and IBM—received top scores across the board, just above Compaq, Gateway, Micron, MidWest Micro, and Quantex.



**ANY DIGITAL PHOTO CAN TRAVEL MILLIONS
OF MILES OVER THE INTERNET, BUT NOT
MANY CAN MAKE IT TEN FEET TO THE WALL.**



Real photographs. That's the goal for digital camera users who want to print their photos. And that's where the HP PhotoSmart C20 digital camera with megapixel resolution enters the proverbial picture. It's chock full of resolution—try printing with 1152 x 872 pixels (then compare with photos from a VGA camera). It stores as many as 40 pictures in JPEG format on a compact, removable 4MB memory card (or up to 240 photos on an optional 48MB card). And because you can also use the 1.8 inch color LCD to review each shot, bad pictures can be instantly deleted to make room for other potential masterpieces. Then, once you have the shots you want, the C20 automatically downloads them into your PC where you can print out thumbnails of all your shots on an index sheet. (Or view your photos on a TV using the handy 16 foot video cable.) The **\$499*** C20 has all the features you'd expect to find—like a built-in flash, auto focus (plus macro mode for amazing close-ups), and a precision glass lens system, plus some you wouldn't expect, like Microsoft® Picture It!™ software and HP PhotoSmart photo finishing software. Many digital cameras give you features. How many give you real photos?



With one eye on these scores, we've also considered the specific makeup of each vendor's support policy and warranty. Ideally, a vendor will provide a warranty that covers at least three years for parts and a year for on-site labor. Toll-free technical support should be available for the life of the product, and on-site service should be provided the next business day after you call in a complaint. If you must ship the system or a part back to the manufacturer for repair, the company should fix it and return it within 48 hours. Naturally, the best service and support are provided by the largest companies with the largest amounts to spend. For detailed information on each machine's support policies, see this issue's special pullout, "Rating PC Companies."

PERFORMANCE

Though performance is not of paramount importance in the world of managed PCs, it's still worth considering. For the most part, the performance of these machines scaled according to clock speed. In our high-end category, the 450-MHz machines, on the average, outperformed the 400-MHz PCs by roughly 9 percent on our High-End Winstone 99 tests. In our mainstream category, 400-MHz Pentium IIs outperformed the 350s by 10 percent during Business Winstone testing, the 333s by 20 percent, and the 300s by 23 percent (all on the average). Winstone performance of the two AMD machines was comparable to that of the four 300-MHz Pentium IIs.

Perhaps the most remarkable performer was Hewlett-Packard's mainstream Vectra VE, which—using a 333-MHz Celeron—turned in higher Winstone scores than most 350-MHz Pentium IIs. Its secondary cache, though smaller than those of the Pentium II systems, runs at full rather than half speed. Yet the roundup's leading performer under both Business and High-End Winstone was the Sys Performance Pro 450, which augments a 450-MHz Pentium II with a 7,200-rpm IBM hard disk and a Matrox Millennium G200 AGP card. Other notably good performers from our high-end category include 450-MHz systems from Compaq, Hewlett-Packard, IBM, Micron, and NexTrend and the 400-MHz machine from HiQ.

Among mainstream systems, the leading performer was the 400-MHz Sys Performance Pro 400BA, which uses the same

Editors' Choice

- High-End: Compaq Deskpro EN 450, HP Vectra VL Series 8 HE
- Mainstream: HP Vectra VE Series 8



Above all, corporate PCs must be easy to manage and service. Our two high-end Editors' Choices—the \$2,670 Compaq Deskpro EN 450 and the \$2,950

HP Vectra VL Series 8 HE—and our mainstream Editors' Choice, the \$1,680 HP Vectra VE Series 8, start by offering you full system inventory capabilities, hardware monitoring and chassis intrusion detection, and Wake on LAN and remote power-on and power-off capabilities. All have tool-free cases, and the Compaq unit even makes changing drives a tool-free chore.

Using Compaq's Insight Manager, the Compaq PC can monitor its disks and memory and detect imminent failure; these components can then be replaced through Compaq's prefailure warranty. When this software is used with Microsoft SMS or another higher-level management package, you can also remotely flash the unit's BIOS, lock its components, and even lock its case.

HP offers the same level of functionality (save for the remote chassis lock) for its high-end system through its pack-

age, HP TopTools 4.0, which also lets you update the system's drivers remotely. The mainstream unit has almost the same capabilities, except that you cannot remotely flash its BIOS or update its drivers. HP TopTools also lets you view and print your systems' asset data, arranging it in a database.

Expansion in these three systems is somewhat limited, however.

The \$2,770 IBM PC 300PL (450), \$2,095 IBM PC 300PL (400), and \$1,670 Compaq Deskpro EN 350 earn an honorable mention. IBM's management capabilities—when fully implemented—more than match those of the HP and Compaq PCs. The Deskpro EN 350 is as capable as its sibling, but its small case, though tool-free and attractive for some offices, severely limits upgradability.

HP and IBM earned top marks across our Service and Reliability Survey, while Compaq earned average and above-average scores.

hard disk and graphics card as its high-end sibling. Other proficient performers include systems from ACT and Xi.

Four systems from three vendors—Highwave, Mega, and Tangent—arrived at PC Magazine Labs with processors that had been overclocked in their BIOS settings; we set all of them back to their appropriate clock speeds before testing began. For more information on such overclocking, see Trends/Inside PC Labs in our previous issue (November 17, 1998).

THE LEADERS

With consideration to feature set, management, ease of repair, service policy, and (as always) performance, we conditionally rec-

ommend—out of the 62 PCs reviewed in the following pages—the offerings from Compaq, HP, and IBM. Among high-end systems, our Editors' Choices are the Compaq Deskpro EN 450 and HP Vectra VL Series 8 HE, with an honorable mention going to the IBM PC 300PL (450). In the mainstream category, our Editors' Choice goes to the HP Vectra VE Series 8, and honorable mentions go to the Compaq Deskpro EN 350 and the IBM PC 300PL (400).

Just behind the Compaq, HP, and IBM PCs are the Dell, Gateway, and NEC systems. Yet many smaller vendors—including Axis and NexTrend—have developed competitive systems. The influence of the managed PC is spreading.

Turn Talk Into Text. Instantly!

L&H Voice Xpress Professional™
is the ultimate continuous speech dictation
software for today's business professional.

L&H Voice Xpress Professional™ turns speech into text
on screen quickly and accurately – without typing.
Build letters, reports, spreadsheets, presentations and
virtually any other document simply by talking normally!

- NEW** Advanced Natural Language Technology offers an
extensive command language that lets you
"Say It Your Way."
- NEW** Dictate to virtually all Windows® applications
creating documents as fast as you speak.
- NEW** Extensive command and control to format and edit
documents in Microsoft® Office, including Word 97/95,
Excel 97, PowerPoint® 97, Outlook® 98, and Outlook®
Express. And, it's optimized for Windows® 98.
- NEW** Four FREE special plug-in vocabularies for Business
& Finance, Leisure, Technology, and In The News.
- NEW** "Talk and Go™" capability for certain hand-held
devices – perfect for the mobile professional.
- NEW** Reads documents back to you – making editing a snap.



\$149⁹⁹*

* estimated retail price

**30-Day Money Back
GUARANTEE**



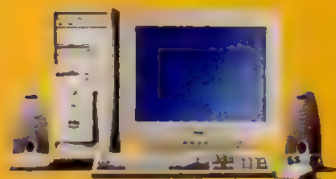
To order, visit our web site, call toll free at 1-800-236-6165
or visit one of our fine dealers listed below.

CompUSA	Office Depot	Best Buy
OfficeMax	ComputerCity	MicroCenter
Staples	Fry's	

L&H
Lernout & Hauspie™
www.lhs.com

**"WHEN THEY GIVE
AN AWARD
FOR WORKING
16 HOURS A DAY,
SEVEN DAYS A WEEK,
ON A SHOESTRING
BUDGET,
GIVE ME A CALL."**

Dell understands the value of hard work. Which is why Dell is the only company to receive *PC Magazine's* Readers' Choice Award for service and reliability two years in a row and *Windows Magazine's* "top-ranking" in its tech support survey. Call, or visit our website.



NEW! DELL DIMENSION XPS R450

PENTIUM® II PROCESSOR AT 450MHz

- 128MB 100MHz SDRAM
- 512KB Integrated L2 Cache
- NEW 12.9GB Ultra ATA Hard Drive
- 17" (15.9" viewable) 1000LS Monitor
- NEW 16MB STB nVidia TNT 3D AGP Graphics Card
- 40X Max™ Variable CD-ROM Drive
- Turtle Beach Montego A3D 64V Sound Card
- harman/kardon HK-195 Speakers
- Iomega Zip 100MB Internal Drive with One Cartridge
- Microsoft® Office 97 Small Business Edition v2.0 plus Bookshelf 98, McAfee VirusScan
- Microsoft Windows® 98
- 3-Year Limited Warranty*
- 1-Year On-site† Service
- ★ Upgrade to a 17" (16.0" viewable, 26dp) Trinitron® 1000HS Monitor, add \$99

\$2199

Business Lease \$83/Mo., 36 Mos
Order Code #591115

- NEW XPS M30**
- Pentium II Processor at 450MHz
 - 256MB 100MHz SDRAM
 - 512KB Integrated L2 Cache
 - NEW 17.2GB Ultra ATA Hard Drive
 - NEW 15" (15.1" viewable) Flat Panel 1500FP Monitor
 - NEW 16MB STB nVidia TNT 3D AGP Graphics Card
 - 4.8X DVD-ROM Drive and Decoder Card
 - Turtle Beach Montego Sound Card
 - ACS-295 Speakers w/Subwoofer

\$3399

Business Lease³: \$129/Mo., 36 Mos
Order Code #591009

- NEW XPS R450**
- Pentium II Processor at 450MHz
 - 128MB 100MHz SDRAM
 - 512KB Integrated L2 Cache
 - 14.4GB Ultra ATA Hard Drive (7200rpm)
 - NEW 19" (18.0" viewable, .26dp) Trinitron P990 Monitor
 - NEW 16MB STB nVidia TNT 3D AGP Graphics Card
 - 40X Max⁴ Variable CD-ROM
 - Crystal 3D 64V Wavetable Sound
 - HK-195 Speakers

\$2499

Business Lease³: \$95/Mo., 36 Mos
Order Code #591102

- NEW XPS R350**
- Pentium II Processor at 400MHz
 - 96MB 100MHz SDRAM
 - 512KB Integrated L2 Cache
 - NEW 12.9GB Ultra ATA Hard Drive
 - 17" (16.0" viewable, .26dp) Trinitron 1000HS Monitor
 - 8MB STB nVidia 3D AGP Graphics Card
 - 40X Max⁴ Variable CD-ROM
 - Crystal 3D 64V Wavetable Sound
 - HK-195 Speakers

\$1949

Business Lease³: \$74/Mo., 36 Mos
Order Code #591110

- Network Designed Desktop**
- Intel[®] Celeron[™] Processor at 333MHz
 - 64MB SDRAM
 - 128KB Integrated L2 Cache
 - 8.4GB Ultra ATA Hard Drive
 - 17" (15.9" viewable) 1000LS Monitor
 - ATI 8MB 3D AGP Graphics
 - 32X Max⁴ Variable CD-ROM
 - Integrated Intel 10/100 Ethernet Controller

\$1399

Business Lease³: \$53/Mo., 36 Mos
Order Code #591104

UPGRADE OPTIONS

- Iomega Zip 100MB Internal Drive with Two Cartridges, add \$99 • 3Com 3C905B 10/100 NIC, add \$50 • NEW 3Com USR V.90⁵ PCI WinModem, add \$49
- Intuit QuickBooks v6.0, add \$118 • Upgrade to MS Windows NT[®] Workstation 4.0, add \$99 • Upgrade to 3-Year Next-Business-Day On-site² Service, add \$99

Dell Inspiron[®] Notebooks with 3D SRS Speakers, Intelligent Lithium Ion Battery, MS Office 97 Small Business Edition v2.0, MS Windows 98, Touchpad, S-Video Port

- 7000 D300LT**
- All-in-One Multimedia Performance**
- Pentium II Processor at 300MHz
 - 15" XGA Active Matrix Display
 - 128MB SDRAM (384MB Max⁶)
 - NEW 8GB Ultra ATA Hard Drive
 - Combo 2X DVD-ROM/Floppy Drive
 - 2X AGP 8MB 3D Video
 - Internal 56K Capable⁷ V.90 Fax Modem
 - 3-Year Limited Warranty¹

\$3849

Business Lease³: \$146/Mo., 36 Mos
Order Code #891117

- 7000 D300LT**
- All-in-One Multimedia Performance**
- Pentium II Processor at 300MHz
 - 15" XGA Active Matrix Display
 - 64MB SDRAM (384MB Max⁶)
 - 4GB Ultra ATA Hard Drive
 - Combo 24X Max⁴ Variable CD-ROM/Floppy Drive
 - 2X AGP 4MB 3D Video
 - Internal 56K Capable⁷ V.90 Fax Modem
 - 3-Year Limited Warranty¹

\$2999

Business Lease³: \$114/Mo., 36 Mos
Order Code #891103

- NEW 3500 D266GT**
- Lightweight, Light Price Notebook**
- Pentium II Processor at 266MHz
 - 14.1" XGA Active Matrix Display
 - 64MB SDRAM (256MB Max)
 - 4GB Ultra ATA Hard Drive
 - Combo 24X Max⁴ Variable CD-ROM/Floppy Drive
 - NeoMagic 256AV AGP Video
 - Internal 56K Capable⁷ V.90 Fax Modem
 - 3-Year Limited Warranty¹

\$2649

Business Lease³: \$100/Mo., 36 Mos
Order Code #891105

- 3200 D233XT**
- Pentium II Processor at 233MHz
 - 13.3" XGA Active Matrix Display
 - 32MB SDRAM (144MB Max)
 - 3.2GB Ultra ATA Hard Drive
 - Modular 24X Max⁴ Variable CD-ROM/Floppy Drive
 - 128-bit Graphics Accelerator
 - Extendable 1-Year Limited Warranty¹
 - ★ Upgrade to 48MB SDRAM, add \$49

\$1999

Business Lease³: \$76/Mo., 36 Mos
Order Code #891107

Dell PowerEdge[®] Servers with 7x24 Server Hardware Telephone Support

- 2300 SERIES**
- (DUAL PROCESSOR/RAID CAPABLE)
- Pentium II Processor at 450MHz
 - 128MB 100MHz ECC SDRAM
 - 9GB Ultra-2/LVD SCSI Hard Drive (Hot-Swap Optional)
 - MS Windows NT Server 4.0
 - APC Smart-UPS 700W Power Supply
 - 3-Year NBD On-site² Service

\$4699

Business Lease³: \$173/Mo., 36 Mos
Order Code #251116

- 2300 SERIES**
- (DUAL PROCESSOR/RAID CAPABLE)
- Pentium II Processor at 350MHz
 - 64MB 100MHz ECC SDRAM
 - 4GB Ultra-2/LVD SCSI Hard Drive (Hot-Swap Optional)
 - 3-Year NBD On-site² Service
 - ★ 12/24GB Variable SCSI DAT Tape Backup Unit, add \$849

\$2549

Business Lease³: \$97/Mo., 36 Mos
Order Code #251104

- 410 SERIES**
- (DUAL PROCESSOR/RAID CAPABLE)
- Pentium II Processor at 450MHz
 - 128MB 100MHz ECC SDRAM
 - 4GB Ultra-2/LVD SCSI Hard Drive
 - 19" (17.9" viewable) 1200HS Monitor
 - Intergraph Intense 3D Pro 3410T Graphics Adapter
 - HK-195 Speakers
 - 3-Year NBD On-site² Service

\$4899

Business Lease³: \$180/Mo., 36 Mos
Order Code #900192

- 410 SERIES**
- (DUAL PROCESSOR/RAID CAPABLE)
- Pentium II Processor at 400MHz
 - 128MB 100MHz ECC SDRAM
 - 4GB Ultra-2/LVD SCSI Hard Drive
 - 17" (15.9" viewable) 1000LS Monitor
 - Diamond 8MB AGP Video Card
 - HK-195 Speakers
 - 3-Year NBD On-site² Service

\$3299

Business Lease³: \$125/Mo., 36 Mos
Order Code #900189



COLOR PRINTERS

- Add an HP[®] DeskJet[®] 722C Color Printer for only \$299.
- Add an HP OfficeJet 600 for only \$499.



Pricing not discountable. *Prices and specifications valid in U.S. only and subject to change without notice. ¹For a complete copy of Guarantees or Limited Warranties write Dell USA L.P., Attn: Warranties, One Dell Way, Round Rock, TX 78682. ²On-site service provided via service contract between customer and third-party provider and is not available in certain remote areas. Technician dispatched if necessary following phone-based troubleshooting with technical support personnel. ³Business leasing arranged by Dell Financial Services L.P., an independent entity, to qualified customers. Above lease payments based on 36-month lease, and do not include taxes, fees, shipping charges, subject to credit approval and availability. Above lease terms subject to change without notice. ⁴40X Max/17X Min. ⁵32X Max/14X Min. ⁶24X Max/12X Min. ⁷Download speeds limited to 53Kbps; upload speeds are less (in the 30Kbps range) and vary by modem manufacturer. Speeds also vary depending on line conditions. Analog phone lines and compatible server equipment required. ⁸PC Magazine, July 1998. Windows 98, Windows NT, and Windows 2000 are registered trademarks of Microsoft Corporation. ©1999 Dell Computer Corporation. All rights reserved.

TO ORDER BY PHONE Keycode #04917

800-590-7455

M-F 7a-9p • Sa 10a-6p • Su 12p-5p CT
In Canada: call 800-233-0702
In Mexico: call 001-800-210-7607
GSA Contract #GS-35F-40760

BUILD YOUR OWN AND ORDER ONLINE

BE DIRECT[™]



www.dell.com/buydirect

AcerPower 8000

Pentium II/450, 8GB disk, 17-inch monitor, SDRAM; High-End Winstone 99: 26.9. \$2,250 street. San Jose, CA; 800-733-2237, 408-432-6200; www.acer.com/aac; 501 at www.pcmag.com/infolink.

• Acer's AcerPower 8000 has solid design and ample support, but no management software was preinstalled in our test unit. The tool-free midtower is lockable, and its interior is fairly clear, but it lacks an intrusion detector. Two Acer Resource CDs, with software such as Intel LANDesk Client Manager 3.3, come with the system. Performance was mostly average except for a low graphics score. Acer had a mix of average and below-average results on our Service and Reliability Survey.—*RSA*

ACMA nPower 6400, 6333

nPower 6400: Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM; High-End Winstone 99: 23.4. \$2,298 direct.
nPower 6333: Pentium II/333, 9.6GB disk, 17-inch monitor, SDRAM; Business Winstone 99: 15.6. \$1,795 direct. Fremont, CA; 800-786-6888, 510-623-1212; www.acma.com; 502 at www.pcmag.com/infolink.

• The ACMA nPower 6333 and nPower 6400 are targeted at the Fortune 1000 and government markets. While ACMA aims to lower TCO by standardizing on one space-saving, tool-free case, there is no compelling reason to buy either PC if you're looking for manageability. Average price and performance are overshadowed by limited expansion capacity as

well as unexceptional support and management features. Prescient Client Management Software came installed and reported asset information, but the units couldn't be moni-



tored by the test server. ACMA services customers within a 50-mile radius, with an 8-business-hour turnaround for repairs; service is outsourced for customers located further away.—*BB*

ACT Brillianta P6II-400HC, P6II-400MC

P6II-400HC: Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM; High-End Winstone 99: 23.9. \$2,098 direct.
P6II-400MC: Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM; Business Winstone 99: 19.5. \$1,998 direct. City of Industry, CA; 800-775-1953, 626-369-4181; www.allcomp.com; 503 at www.pcmag.com/infolink.

• The mainstream ACT Brillianta P6II-400MC and the high-end P6II-400HC both scored well

on our tests but are unsuitable if you're looking for true managed systems. Intel's software LANDesk was included with the ACT PCs but didn't work correctly on either machine; we suspect this is due to improper setup of the software. On the P6II-400MC, LANDesk was installed and ran but didn't report any system information. LANDesk wouldn't run on the high-end P6II-400HC.

Each system's case is not tool-free, but the motherboard slides out easily, giving you access to the CPU, memory, expansion card slots, and drives. The P6II-400MC has no free IRQs, however. The standard one-year warranty includes limited technical-support hours but no on-site service.—*BB*

Axis Metropolis GX5 400, NX5 300

GX5 400: Pentium II/400, 8.0GB disk, 19-inch monitor, SDRAM; High-End Winstone 99: 24.8. \$1,999 direct.
NX5 300: Pentium II/300, 4.1GB disk, 15-inch monitor, SDRAM; Business Winstone 99: 13.7. \$1,099 direct. Sunnyvale, CA; 800-378-9014, 714-780-1788; www.axisys.com; 505 at www.pcmag.com/infolink.

• Large-scale enterprises may not be satisfied with the Axis units, but companies with small networks can benefit from the systems' low prices and fairly good level of manageability. These systems require a screwdriver to access and change components. Both the mainstream Axis Metropolis NX5 300 and the high-end GX5 400, however, could accurately

BENCHMARK TESTS High-End Corporate PCs

The top-scoring Sys and Micron PCs packed the most punch on our High-End Winstone tests. These systems were powered by fast, 7,200-rpm hard disks and top-performing 2-D graphics cards using the Matrox G-200 and nVidia RIVA 128 chip sets. The Quantex and SAG units were unable to complete our High-End Winstone tests, probably because of graphics card driver problems.

We found an interesting trend: On the Business Winstone tests, the high-end Pentium II/400-based systems (128MB of RAM, Windows NT 4.0) outscored the mainstream Pentium II/400s (64MB of RAM, Windows 95) by 50 percent, on the average. Since the new Winstone program is suite-based, it loads all the applications into memory and runs one at a time; thus, more memory is clearly a boon.

The Highwave, Mega, and both Tangent systems came in with their CPUs running faster than the proper ratings. We clocked all these systems down to the correct speed and tested them at that speed.

▲ High scores are best.

▼ Low scores are best.

Bold type denotes first place.

■ denotes Editors' Choice.

	20 High-End Winstone 99	20 Business Winstone 99
AcerPower 8000 (PII/450)	26.9	27.4
ACMA nPower 6400	23.4	27.2
ACT Brillianta P6II-400HC	23.9	29.1
Axis Metropolis GX5 400	24.6	26.9
Compaq Deskpro EN 450	27.9	29.9
Dell OptiPlex GX1p (PII/450)	27.5	25.8
DTK APRI-80M/P350	24.2	26.4
Duracom ProForma 6301 (PII/450)	24.3	28.0
Gateway E-4200 450	27.1	28.4
GST Celestial Storm 400N	22.0	23.4
HP Vectra VL Series 8 HE (PII/450)	28.0	31.5
Highwave Scorpion 400	24.5	25.4
HIQ Impact Pro (PII/400)	26.9	30.8
IBM PC 300PL (PII/450)	28.1	30.5
Maximus Powerman Workstation (PII/400)	22.9	25.5
Mega Impact PII400 128MX	23.5	29.7
Micron ClientPro 450	28.4	31.8
MidWest Micro Business Solutions WKP-450	22.3	27.8
NEC PowerMate 8100 (PII/450)	24.1	28.1
NexTrend NexStar-450MP	28.2	31.5
Polywell Poly 800B5 (PII/400)	24.0	26.7
ProGen Polaris PII 450	24.4	30.2
Quantex QP6/450 SB-5	N/A	29.3
Reason Square 1 BX/A (PII/450)	24.4	29.6
Royal Power Desktop (PII/400)	26.1	29.4
SAG STA Dual Power System 400	N/A	27.8
Sys Performance Pro 450	28.9	32.3
Tagram Platinum T5700 (PII/450)	23.8	29.2
Tangent Medallion BX 400	23.2	26.7
Toshiba Equium 7100D (PII/400)	22.0	25.1
XI 400 MTower SP	26.3	29.9

N/A—Not applicable. The product could not complete this test.

BETTER ►

BETTER ►

report most system information and problems both locally and remotely, with the exception of chassis intrusion. Asset information even included parts' serial numbers. The NX5 300 had very low test scores; the GX5 400's were average. A good warranty, with round-the-clock technical support, accompanies each system.—BB

Compaq Deskpro EN 450, 350

Deskpro EN 450: Pentium II/450, 9.6GB disk, 17-inch monitor, SDRAM; High-End Winstone: 27.9. \$2,670 street.
Deskpro EN 350: Pentium II/350, 6.4GB disk, 17-inch monitor, SDRAM; Business Winstone: 16.4. \$1,670 street. Houston; 800-345-1518, 281-370-0670; www.compaq.com.



Compaq's Deskpro ENs are nearly ideal for any office LAN—vast, large, or small. The Compaq Deskpro EN 450, one of our Editors' Choices, and the compact Desktop EN 350 offer little room for expansion but have excellent management features.

They are well priced, are very easy to service (with no tools needed even to replace drives), and offer respectable performance.

Both machines are equipped with Compaq's Intelligent Manageability, which comprises a wide range of management software and hardware. Using Insight Manager, the basic remote-management package, we were able to inventory these PCs, monitor their internal temperatures, identify chassis intrusions, and

detect imminent problems with disk and memory subsystems. Faulty disk and memory can then be replaced under Compaq's pre-failure warranty. When used in tandem with larger network packages, Intelligent Manageability allows you to flash a system's BIOS remotely, lock several of its components, and—in the case of the high-end Deskpro EN 450—lock down its chassis. In case you're not using a larger network package for management, Compaq offers a downloadable utility for simple Wake on LAN functions.

The warranty includes 24-hour, 7-day technical support and one year of on-site service. Compaq did well on our Service and Reliability Survey.—CM

Comtrade Professional 400

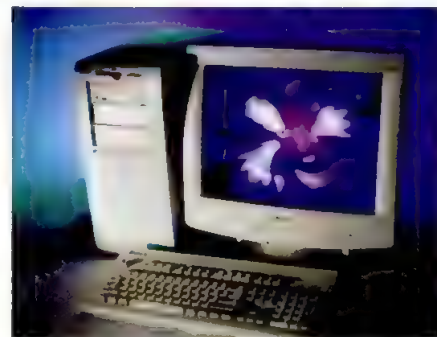
Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM; Business Winstone 99: 17.9. \$2,145 direct. City of Industry, CA; 800-868-5588, 818-961-6688; www.comtrade.com; 506 at www.pcmag.com/infolink.

•The Comtrade Professional 400 might make a good standalone PC, but it falters as a managed system. Its Intel LANdesk Client Manager 3.1 could see some asset data locally, but there were no networking clients installed for the LAN connection or remote management. The system lacks a case lock and an intrusion detector. This average performer comes with six-day, business-hours technical support and a short, one-year warranty.—RSA

Dell OptiPlex GX1p, GX1

OptiPlex GX1p: Pentium II/450, 13.8GB disk, 19-inch monitor, SDRAM; High-End Winstone 99: 27.5. \$2,942 direct. **OptiPlex GX1:** Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM; Business Winstone 99: 17.4. \$2,136 direct. Round Rock, TX; 800-338-8542, 512-338-4400; www.dell.com; 509 at www.pcmag.com/infolink.

•The Dell OptiPlex GX1p and OptiPlex GX1 have the hallmarks of true managed PCs: lockable cases that open at the push of a button, interiors designed with swing-away power



supplies for easy servicing, and good management features, including intrusion detectors and support for remote BIOS updates. Dell's OptiPlex line stresses reliability at the expense of a little performance, but both PCs earned average marks on our tests.

Dell's OpenManage Client Administrator 4.2 supports all major management standards. We succeeded in remotely waking the unit,

ZD Graphics WinMark 99

High-End ▲ Business ▲

252	78
283	101
295	132
284	96
320	171
307	95
259	146
307	123
299	103
260	82
328	170
266	91
309	170
315	168
267	84
303	163
280	93
313	166
301	109
313	156
287	88
324	172
322	124
324	174
301	164
290	159
327	173
323	172
268	94
276	104
303	166

ZD Disk WinMark 99

High-End (thousands of bytes/sec) ▲ Business (thousands of bytes/sec) ▲

9,820	4,160
6,680	3,840
6,700	3,760
7,130	2,860
9,960	4,170
8,520	3,210
10,000	3,960
6,440	3,420
8,170	3,730
5,640	2,680
9,370	4,200
7,450	2,770
9,690	4,170
9,710	4,680
6,280	3,420
6,620	3,840
9,900	4,080
6,130	3,350
6,430	3,680
9,470	4,660
6,690	4,170
6,520	3,880
6,950	3,800
6,200	2,830
9,880	4,130
6,320	2,790
10,000	4,620
5,700	2,770
6,810	3,670
5,620	2,890
9,090	3,610

ZD CD-ROM WinMark 99

1,110	1,890
1,030	1,980
1,040	1,550
1,040	2,020
1,100	1,900
1,100	2,250
879	2,080
1,090	1,860
1,120	1,960
998	1,950
1,120	2,010
1,010	1,460
1,050	1,980
1,120	1,750
1,030	1,510
1,030	1,950
1,100	2,120
1,100	1,920
1,120	1,940
1,110	1,800
1,030	1,470
1,110	1,650
1,100	1,790
1,100	1,860
1,030	1,980
1,000	1,970
1,120	2,120
1,100	1,990
1,030	1,920
1,010	1,930
1,040	1,530

CD-ROM:

Transfer Rate Inside (thousands of bytes/sec) ▲	Access Time (ms) ▼	CPU Utilization (percent) ▼
2,610	100	1
2,310	84	35
2,770	91	32
2,310	85	4
2,380	106	1
2,710	76	1
2,280	83	4
2,230	81	37
2,280	84	3
2,310	84	35
2,370	96	1
2,260	103	1
2,310	81	4
2,340	91	3
2,250	102	32
2,320	84	36
2,410	77	1
2,410	78	36
2,330	78	34
2,290	79	30
2,430	105	32
2,240	94	34
2,280	105	32
2,220	90	1
2,270	83	3
2,260	79	34
2,280	81	3
2,290	83	35
2,320	80	35
2,330	83	35
2,050	93	59



*Capable of reaching at least 96 Kbps and coming at up to 31.7 Kbps, due to FCC regulations, an power output, reaching speeds are limited to 5.7 Kbps. Actual speeds may vary. Requires compatible phone line and server equipment. Complies with both the determined V.90 and V.42bis technology protocols. Standard officially determined in February, 1998, with also reported in September, 1998. Hicomson Communications Laboratories performance tests of loading internal data for medium, type 1998. See www.hicom.com/50k. ©1998 Hicom Corporation. All rights reserved. Hicom, the Hicom logo and H.S. Robotics are registered trademarks and More connected. is a trademark of Hicom Corporation.

The World's Best Selling
56K Modem



Tired of your old 28.8
modem slowing you down?
It's time to move to 3Com
U.S. Robotics® V.90 56K*

3Com U.S. Robotics

desktop modems. They
deliver significantly greater
overall performance† than
other V.90 56K modems for
truly high speed down-
loads, streaming video,
and near CD-quality audio.
So visit your nearest
3Com retailer or find us at
www.3com.com/56k for
more information. Because
when it comes to getting the
most out of the Internet, the
modem makes the difference.

ANY MODEM WILL GET YOU
ON THE INTERNET.
THEN AGAIN, ANY CAR WILL GET
YOU ON THE FREEWAY.



3Com® More connected.™

detected PC health alerts, and gathered typical asset data. Dell also offers OpenManage packages for RISC platforms, a plus for offices with multiple network environments.

Dell provides a three-year warranty with each PC. Units can be returned for service in the first year; after that, Dell provides a parts-exchange service for the second and third years. Toll-free technical support is available around the clock for the life of each unit. Dell earned rare top marks across our Service and Reliability Survey. —RSA

DTX APRI-80M/P350, APRI-76M/P266

APRI-80M/P350: Pentium II/350, 8GB disk, 17-inch monitor, SDRAM; High-End Winstone: 24.2. \$1,800 street. **APRI-80M/P266:** Pentium II/266, 4.1GB disk, 15-inch monitor, SDRAM; Business Winstone: 14.5. \$1,270 street. City of Industry, CA; 800-289-2385; 626-810-0098; www.dtkcomputer.com; 511 at www.pcmag.com/infolink.

• DTK's two corporate entries are well-designed, aggressively priced machines. Their management features, including easy-to-service cases, make them well suited for small- to medium-sized networks. Both offer good asset data collection and complete hardware monitoring, and they responded well to remote restart/shutdown requests. Neither PC has an intrusion detection switch, however, and while their motherboards support Alert on LAN, their network cards do not

The APRI-80M/P350 was an above-average performer; the APRI-80M/P266, below average for its class. The company provides round-the-clock support through a combination of in-house and third-party technicians. —JAH

Duracom ProForma 6301, ProForma 6221

ProForma 6301: Pentium II/450, 6.2GB disk, 17-inch monitor, SDRAM; High-End Winstone: 24.3. \$2,495 street. **ProForma 6221:** Pentium II/400, 4.2GB disk, 15-inch monitor, SDRAM; Business Winstone: 16.9. \$1,595 street. Carrollton, TX; 800-551-9000, 972-416-7600; www.duracom.com; 512 at www.pcmag.com/infolink.

• Typically sold as a server or a high-end workstation, the ProForma 6301—a nearly three-foot-tall tower—should never be used as a common office machine on a common LAN. It takes up too much space; its components are difficult to access; and it ships without a client management package. (The 6301 typically ships with LANdesk Server Manager; Client Manager is loaded for a fee.) The much smaller ProForma 6221 is a better option for the corporate environment, but it, too, lacks a tool-free chassis and offers a less-than-ideal LANdesk 3.1 implementation. The 6221 provides fairly complete asset data and hardware monitoring but lacks a chassis alarm. The fan monitor malfunctioned on our test system.

Both systems produced mostly average to below-average test scores. The 6221 lacks

free IRQs. Customers in the Dallas/Fort Worth area typically get on-site service within 24 hours; those in other locations may wait as long as 72. —CM

Gateway E-4200 450, E-3200 400

E-4200 450: Pentium II/450, 8.0GB disk, 19-inch monitor, SDRAM; High-End Winstone 99: 27.1. \$2,328 direct. **E-3200 400:** Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM; Business Winstone 99: 17.4. \$1,799 direct. N. Sioux City, SD; 800-846-2000; 605-232-2000; www.gateway.com; 513 at www.pcmag.com/infolink.

• Gateway's two managed systems each offer the same high level of manageability and are backed by specially trained technical support teams. The E-3200 400 has a compact and highly accessible case; the E-4200 450, a conventional case that allows more flexibility and expansion. The E Series stresses parts stability and has an 18-month availability goal for all components.

Both systems came with LANdesk Client Manager 3.3 software, which reported complete asset data including component serial numbers. It correctly assessed drive and memory status, voltage levels, and case temperature but didn't report fan speeds. Also, existing chassis intrusion detection switches were not enabled in the software. Both units were strong, average performers. Gateway earned good marks on our Service and Reliability Survey. —BB

BENCHMARK TESTS

Mainstream Corporate PCs

Again the faster CPUs—Pentium II/400s—powered the top-performing Sys Performance Pro 400BA and ACT Brillianta P6II-400MC on the Business Winstone tests. Fast drives and 2-D graphics chip sets like the Matrox G 200 were at the heart of their performance. The HP Vectra VE Series 8 came with the new Celeron/333, with 128K of full-CPU-speed L2 cache, its remarkable Winstone score was comparable to those of the Pentium II/350 PCs even though it runs at a slower clock speed and on a 86-MHz bus.

The HP Vectra VE Series 8's new Celeron did not fare well on the CPUmark₉₉ test; its score was 25 percent lower than that of the average midrange corporate system. The top Disk WinMark scores—from the Sys Performance Pro 400BA, ACT Brillianta P6II-400MC, Dell OptiPlex GX1, and Gateway E-3200 400—were courtesy of the IBM DTTA-371010 hard disk, which spins at 7,200 rpm. Top 2-D graphics performance was achieved by systems using the Matrox G 200 chip set.

▲ High scores are best.

▼ Low scores are best.

Bold type denotes first place.

■ denotes Editors' Choice.

	ZD Business Winstone 99	ZD Business Graphics WinMark 99 ▲
ACMA nPower 6333	15.6	64
ACT Brillianta P6II-400MC	19.5	131
Axis Metropolis NX5 300	13.7	41
Compaq Deskpro EN 350	16.4	78
Comtrade Professional 400	17.9	136
Dell OptiPlex GX1 (PII/400)	17.4	81
DTK APRI-80M/P266 (PII/333)	14.5	92
Duracom ProForma 6221 (PII/400)	16.9	80
Gateway E-3200 400	17.4	85
GST Celestial Storm 333N	15.7	75
■ HP Vectra VE Series 8 (Celeron/333)	17.1	102
Highwave Tercel 300 (AMD K6/300)	14.7	63
HiQ Impact Elite (AMD K6/300)	15.1	81
IBM PC 300PL (PII/400)	18.6	134
Maximus Executive Workstation (PII/400)	18.4	110
Mega Impact PII333 64MX	16.4	6
Micron ClientPro 350	16.9	85
MidWest Micro Business Solutions WKP-350	16.3	76
NEC PowerMate Enterprise 8000 (PII/333)	16.9	91
ProGen Polaris PII 350	17.6	116
Quantex OP6/350 SB-3	17.3	91
Reason Square 6 BX/JN (PII/350)	16.1	19
SAG STA Dual Power System 300	15.2	68
Sys Performance Pro 400BA	19.6	137
Tagram Platinum T5300 (PII/266)	15.5	89
Tangent Medallion BX 300 (PII/333)	13.3	51
Toshiba Equium 7000S (PII/333)	15.2	68
Total Serengeti BX350	16.9	85
Unicent Avanta L300	15.0	73
Xi 400 MTower CSP	19.2	131
Zenon Z-Corp (PII/300)	15.3	69

BETTER ►

GST Celestial Storm 400N, Celestial Storm 333N

400N: Pentium II/400, 6.2GB disk, 17-inch monitor, SDRAM; High-End Winstone: 22. \$2,195 direct. **333N:** Pentium II/333, 4.3GB disk, 17-inch monitor, SDRAM; Business Winstone: 15.7. \$1,549 direct. Cerritos, CA; 800-567-2764; www.aapogee.com/index.htm; 514 at www.pcmag.com/infolink.

• GST's two Celestial entries are best suited for smaller networked environments. Both come in conventional cases and provide spare but serviceable desktop management tools. Both systems responded correctly to remote shutdown, remote restart, and Wake on LAN requests. Neither unit, however, came configured for hardware monitoring of temperature or fan speed, and both lacked a chassis intrusion alarm.

While the mainstream Celestial 333N had mostly average benchmark test results, the Celestial 400N was the slowest high-end corporate PC we tested. Both come with a fairly good warranty. —JAH

HP Vectra VL Series 8 HE, Vectra VE Series 8

HP Vectra VL Series 8 HE: Pentium II/450, 9.6GB disk, 17-inch monitor, SDRAM; High-End Winstone: 28. \$2,950 street. **HP Vectra VE Series 8:** Celeron/333, 4.1GB disk, 17-inch monitor, SDRAM; Business Winstone: 17.1. \$1,680 street. Palo Alto, CA; 800-322-4772, 415-857-1501; www.hp.com/go/vectra; 516 at www.pcmag.com/infolink.



When it comes to easily managed and easily serviced machines, only Compaq and IBM can rival Hewlett-Packard. The Vectra VL and the Vectra VE, both Editors' Choice winners, are near-perfect managed systems: Built for the large corporate LAN, they offer neat, tool-free chassis designs and HP's management package TopTools. Neither system leaves you with a lot of room to upgrade, however.

Both offer industry-leading management capabilities. With TopTools—whose Web-



based remote half plugs into OpenView, Microsoft SMS (and soon CA Unicenter), and is available for download as a standalone—we were able to wake these systems up, take inventory, detect failures and intrusions,

monitor voltages, and lock various hardware components. You can also remotely flash the BIOS and update the drivers on the VL.

Expansion is limited. The VL lacks an AGP slot, a second serial port, and a free external 3.5-inch drive bay; similarly, the VE lacks a free external bay and has no free IRQs. The VL was an excellent performer on most of our tests. The VE, which used the new Celeron with 128K of L2 cache, outperformed every 333-MHz Pentium II here and even a few 350-MHz PCs. HP earned top marks across our Service and Reliability Survey. —CM

Highwave Scorpion 400, Tercel 300

Scorpion 400: Pentium II/400, 6.1GB disk, 17-inch monitor, SDRAM; High-End Winstone 99: 24.5. \$1,769 direct. **Tercel 300:** AMD K6-2/300, 4.1GB disk, 15-inch monitor, SDRAM; Business Winstone 99: 14.1. \$989 direct. San Jose, CA; 408-432-3888; www.highwavetech.com; 518 at www.pcmag.com/infolink.

• Highwave's Scorpion 400 and Tercel 300 have attractive prices but little else. The Scorpion 400 starts off with an overclocked CPU—a dangerous practice that can damage the system and voids the part's warranty. (We reset the clock before testing.)

Intel LANdesk Client Manager was installed and most asset data was available, but the 400's CPU fan was detected as a chassis fan and an incorrect critical fan failure alert was sent. Temperature was also misreported as an astronomical 11-digit figure. The system comes in a non-lockable midtower case. The Tercel 300 comes in a lockable case but did not even have a DMI client installed. Neither unit offered intrusion detectors. The 400 had average performance for its class, while the 300 had below-average scores. —RSA

HiQ Impact Pro, Impact Elite

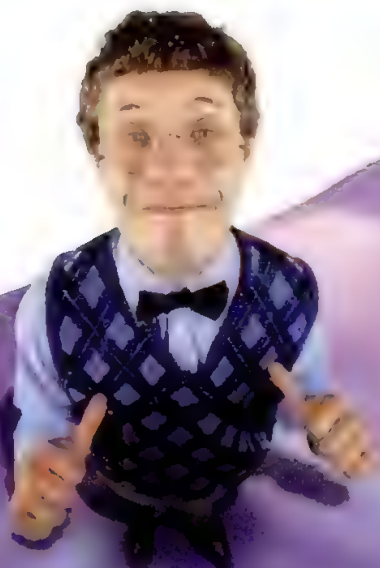
HiQ Impact Pro: Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM; High-End Winstone 99: 26.9. \$2,059 direct. **HiQ Impact Elite:** AMD K6-2/300, 4.1GB disk, 17-inch monitor, SDRAM; Business Winstone 99: 15.1. \$999 direct. Sunnyvale, CA; 800-827-5836, 408-245-5836; www.hiq.com; 519 at www.pcmag.com/infolink.

• If you're in a small to medium-sized networked environment you may want to consider these HiQ units. The AMD K6-2/300-based Impact Elite is a good buy when low cost per station matters most; it lacks free IRQs, however. The Impact Pro, intended for power-hungry users, scored well in benchmark testing.

Both units come in conventional cases. Both have LANdesk Client Manager 3.2, which reported most asset data and had functional hardware monitoring, but there was no chassis intrusion switch. The units rebooted remotely but neither supports Alert on LAN. —BB

ZD Business Disk WinMark 99 (thousands of bytes/sec) ▲	ZD CPUmark 99 ▲	ZD CD-ROM WinMark 99 (thousands of bytes/sec) ▲	CD-ROM Transfer Rate (thousands of bytes/sec) ▲	Access Time (ms) ▼	CPU utilization (percent) ▼
2,730	827	1,350	2,320	86	35
2,850	1,030	1,250	2,490	90	34
2,060	778	1,380	2,270	84	37
2,610	866	1,030	1,170	139	4
2,470	1,060	1,450	2,210	80	35
2,820	979	1,510	2,260	80	4
1,800	694	1,320	2,260	81	44
1,900	1,020	1,310	2,260	95	36
2,820	1,010	1,420	2,300	86	4
2,200	823	1,330	2,280	86	43
2,320	654	1,480	2,360	77	5
2,090	740	759	2,270	128	17
2,210	705	1,470	2,280	82	23
2,220	1,020	1,310	2,110	91	3
2,200	987	1,090	2,260	103	38
2,360	851	1,360	2,290	81	42
2,800	871	1,300	634	94	4
1,970	891	1,360	2,340	78	38
2,380	830	1,350	2,200	84	34
2,640	860	1,180	2,210	97	39
2,480	871	1,370	2,280	85	37
2,200	892	1,410	2,280	84	37
2,410	730	1,260	2,250	86	5
3,020	1,020	1,540	2,270	83	6
2,520	722	1,010	2,100	84	59
1,740	853	1,320	2,270	87	42
1,990	829	1,230	2,060	98	37
2,160	898	1,200	2,310	86	37
2,080	778	1,090	2,300	85	6
2,530	1,030	867	2,080	90	60
2,510	744	1,230	2,190	98	38

Learn to program, compile, download, and most important, save.



Steve in Silicon Valley

"I'm building a serious **e-commerce** site right now. With ZD University, I can tweak my development skills without ever leaving my desk."



Tia in Tucson

"When I need to upgrade my programming skills in areas such as **Visual Basic** or **C++**, I go to ZD University. Well, actually the classroom comes to me."



Peter in Prague

"I'm responsible for our **Windows NT** network. Online training not only makes sense, it's the most affordable way to go."

www.zdu.com

More than 100 online classes—
all for just \$7.95 per month.

If keeping up with today's hot computing technology is part of your job—or part of your life—ZD University is simply the most affordable, most convenient way to do it.

To try ZD University for FREE, visit us on the Web at www.zdu.com today.

ZD
UNIVERSITY
Learning for a Connected World
Online



WHO DO YOU DO IT FOR?



**Winner takes all.
New Rules. New Tools.™**





HELP FOR THE MOBILE WORKAHOLIC

When using TREK² on the plane, try not to laugh when the 14.1 inch monitor dwarfs the guy's next to you. It's just not a very nice thing to do.

Pack light — there's nothing worse than a carry-on that leaves divots in your shoulder, which is why the TREK² is as thin as 1.7" and as light as 7.2lbs.

Avoid the isolation induced by the single use, personal mini-soaps of the hotel room by staying connected with an optional 56K modem.**

IT'S ALMOST SILLY TO CALL A 300MHz NOTEBOOK WITH DVD, AGP GRAPHICS AND A 14.1" DISPLAY A "BUDGET PORTABLE"



AMY ALCORN, MD

Pediatrician
System: Micron TransPort TREK
Favorite Feature: Brilliant Display
Purpose: Online Medical Research
For The Whole Story: www.micronpc.com



BOB PARKER

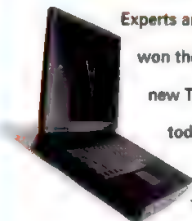
Owner/Founder Parker Motor Sports
Dominant Indy Race Car Team
Systems: Micron TransPort TREK Notebooks/
Millennia Desktops
Favorite Feature: Speed — Of Course!
Purpose: Telemetry between Indy Car and Pit Crew
For The Whole Story: www.micronpc.com

"The TransPort TREK
is the Fastest Budget
Notebook We've Seen
Through Our Mail."
—PC World (March 11)
"Best Buy" April '98

New! 300MHz
14.1" XGA TFT display
64MB SDRAM
3.2GB hard drive (removable)
DVD II-ROM drive
Just \$2,899



PENTIUM[®] II PROCESSOR POWER, AGP GRAPHICS, DVD AND A 14.1" DISPLAY AT BREAKTHROUGH PRICING



Experts and industry pundits all agree that Micron makes some of the world's best notebooks. Our product lines have won the coveted *PC Magazine* Editors' Choice award along with a myriad of other prestigious awards. And the new TransPort[®] TREK[™] is no exception. *PC World* ranked the new TransPort TREK the #1 budget notebook available today[†]. And with a Pentium II processor 300MHz, AGP graphics, optional DVD and a gigantic 14.1" display, the TransPort TREK² is one of the best desktop replacements you can buy. Call Micron today and get a TransPort TREK² custom configured to your specific needs direct from the factory at unbelievably low prices.

©1998 Micron Electronics, Inc. All Rights reserved. Micron Electronics is not responsible for omissions or errors in typography or photography. All purchases are subject to availability. Prices and specifications may be changed without notice, prices do not include shipping and handling and any applicable taxes. Prices do not include return freight and original shipping/handling charges, applies only to Micron brand products and laptops from date of shipment. All sales are controlled by Micron Electronics' current terms and conditions of sale. The Intel Inside Logo and Pentium are registered trademarks and Pentium II, Celeron and MMX are trademarks of Intel Corporation. Microsoft, Windows, Windows NT and the Windows logo are registered trademarks of Microsoft Corporation. Product names of third parties are trademarks or registered trademarks of Micron Electronics, Inc. Other product names used in this publication are for identification purposes only and may be trademarks of their respective companies. Note: advertised configurations may differ from actual shipping configurations. **All land line rates calculated with 1GB equal to 1 billion bytes. †The TransPort TREK 150MHz system was ranked #1 by *PC World*. At the time of ranking, the system was code-named "Micron Meridian". †††System Wizard Mobile Client not available with Windows NT. ††††TechSource base prices are based on a 36-month lease and are available to business customers. Businessmen can qualify for 60-day same-as-cash and individuals for 6-month same-as-cash programs. If purchase advance and related charges are not paid in full within 60 days from purchase date for business or within 180 days from purchase date for individuals, finance charges will be assessed from purchase date. APR varies and is 17.99% as of 6/25/98 with a minimum finance charge of \$16.66. Term financing is available to individuals for home or business use. PowerExchange accepts trade in of most major computer brands. Please call for details and the latest qualified brand list. Cash rebates are based on the average wholesale value of your PC per the Orion Blue Book, or other source chosen by Micron, adjusted for condition at trade-in.

A non-refundable up-front freight charge applies for participation in PowerExchange to cover cost of return packaging and processing.

Clients Don't Come To You

12

VOL. 1 SEC. 03
pg. 12

Work hard, but leave time for some major goofing off. And with a DVD-ROM drive and 3.5" floppy included, whether it's games or work, you'll have access to it all.

Don't be afraid to buy your notebook. Sometimes, nothing is more comforting to the weary road warrior than 300MHz of mobile desktop-replacing power.

The world is a book,
and those who do not
travel, read only a page.
—William Goins, III



TREK² 233



TREK² 233



TREK² 266



New!
TREK² 300

New Featuring
Brilliant 14.1" Display!
DVD-ROM drive!

Model Name

Processor Intel® Pentium® II processor 233MHz
Cache 512KB L2 pipeline burst cache
RAM 32MB EDO DRAM
Hard Drive 3.2GB hard drive (removable)*
Monitor 12.1" SVGA TFT display
Extra Storage 3.5" floppy disk drive (dedicated bay)
DVD/CD-ROM 24X CD-ROM drive (dedicated bay)
Graphics 4MB AGP graphics accelerator
Sound System Built-in stereo speakers & microphone
Warranty 5-year/1-year Micron limited warranty

Processor Intel Pentium II processor 233MHz
Cache 512KB L2 pipeline burst cache
RAM 64MB SDRAM
Hard Drive 3.2GB hard drive (removable)*
Monitor 13.3" XGA TFT display
Extra Storage 3.5" floppy disk drive (dedicated bay)
DVD/CD-ROM 24X CD-ROM drive (dedicated bay)
Graphics 4MB AGP graphics accelerator
Sound System Built-in stereo speakers & microphone
Warranty 5-year/1-year Micron limited warranty

Processor Intel Pentium II processor 266MHz
Cache 512KB L2 pipeline burst cache
RAM 64MB SDRAM
Hard Drive 3.2GB hard drive (removable)*
Monitor 14.1" XGA TFT display
Extra Storage 3.5" floppy disk drive (dedicated bay)
DVD/CD-ROM 24X CD-ROM drive (dedicated bay)
Graphics 4MB AGP graphics accelerator
Sound System Built-in stereo speakers & microphone
Warranty 5-year/1-year Micron limited warranty

Processor Intel Pentium II processor 300MHz
Cache 512KB L2 pipeline burst cache
RAM 64MB SDRAM
Hard Drive 3.2GB hard drive (removable)*
Monitor 14.1" XGA TFT display
Extra Storage 3.5" floppy disk drive (dedicated bay)
DVD/CD-ROM DVD-ROM drive (dedicated bay)
Graphics 4MB AGP graphics accelerator
Sound System Built-in stereo speakers & microphone
Warranty 5-year/1-year Micron limited warranty

Software Included Microsoft® Windows® 98
System Wizard Mobile Client™
Norton AntiVirus

Software Included Microsoft Windows 98
Microsoft Office Small Business Edition
System Wizard Mobile Client™
Norton AntiVirus

Software Included Microsoft Windows 98
Microsoft Office Small Business Edition
System Wizard Mobile Client™
Norton AntiVirus

Software Included Microsoft Windows 98
Microsoft Office Small Business Edition
System Wizard Mobile Client™
Norton AntiVirus

Also Includes: Zoomed Video capable
Li-Ion battery (dedicated bay)
Microphone, stereo line-in/out jacks
Touchpad pointing device
CardBus ready
S-Video & NTSC out; MPEG compatible
WaveTable/3D Positional Sound
2-way fast infrared port
2 Type II/1 Type III PCMCIA slots
2-USB, parallel, serial, VGA, PS/2 ports

Also Includes: Zoomed Video capable
Li-Ion battery (dedicated bay)
Microphone, stereo line-in/out jacks
Touchpad pointing device
CardBus ready
S-Video & NTSC out; MPEG compatible
WaveTable/3D Positional Sound
2-way fast infrared port
2 Type II/1 Type III PCMCIA slots
2-USB, parallel, serial, VGA, PS/2 ports

Also Includes: Zoomed Video capable
Li-Ion battery (dedicated bay)
Microphone, stereo line-in/out jacks
Touchpad pointing device
CardBus ready
S-Video & NTSC out; MPEG compatible
WaveTable/3D Positional Sound
2-way fast infrared port
2 Type II/1 Type III PCMCIA slots
2-USB, parallel, serial, VGA, PS/2 ports

Also Includes: Zoomed Video capable
Li-Ion battery (dedicated bay)
Microphone, stereo line-in/out jacks
Touchpad pointing device
CardBus ready
S-Video & NTSC out; MPEG compatible
WaveTable/3D Positional Sound
2-way fast infrared port
2 Type II/1 Type III PCMCIA slots
2-USB, parallel, serial, VGA, PS/2 ports

Price

\$1,799 *63/mo.

TechRefresh Bus.
Lease, 36 mos.**

\$2,299 *80/mo.

TechRefresh Bus.
Lease, 36 mos.**

\$2,599 *91/mo.

TechRefresh Bus.
Lease, 36 mos.**

\$2,999 *105/mo.

TechRefresh Bus.
Lease, 36 mos.**

New Rules. New Tools.™



Micron™ notebooks are among the very best available. Our notebooks have been critically acclaimed by industry pundits and power users alike. And the TransPort TREK² is no exception. Call Micron today and order any of our award-winning notebooks custom configured to meet your specific needs.



ORDER DIRECT 1-888-669-0974

Call us toll-free or order online at www.micronpc.com/pcmag



Faster...Faster...Faster...

1 Clocking at speeds over 600MHz, the cheetah is the fastest land animal. This "big cat" hunts mainly gazelle, but the average cheetah lasts only about 20 seconds.

2 In early October 1998, PC World Magazine ranks the Micron Millennium the #1 Power Desktop on the market calling it "the fastest of all" systems tested.

NOW, THE 450MHz MICRON MILLENNIA IS ONLY \$1699

(IT DOESN'T GET ANY BETTER THAN THIS)

Raytheon Data Systems
Defense Contractor



Micron Systems:
Over 100,000 deployed Micron desktops, notebooks & servers

Favorite Feature:
Price/power ratio

Purpose:
Help maintain US security and freedom

For The Whole Story: www.micronpc.com

Tim Willits
Lead Map Designer, Id Software
Creators of Quake & Quake II



Micron Systems:
Micron Millennium 400 desktops

Favorite Feature:
400MHz - Of course

Purpose:
Test mind-bending levels of Quake II and help create one of the coolest games ever

For The Whole Story: www.micronpc.com

**PCWEEK READERS
RANK MICRON #1 IN
DESKTOP CUSTOMER
SATISFACTION**



Millennia 150
Oct '98
Sep '98



Millennia 400
Oct '98
Sep '98



Millennia 450 MAX
Nov '98



450MHz at \$1699

- 64MB 100MHz SDRAM
- 8.4GB Ultra ATA Hard Drive
- 17" Micron 700Vx monitor (15.9" display)
- Upgrade to Monsoon 3 piece flat panel speakers \$179 w/subwoofer

Featuring Intel's Fastest Processor Ever

Just named #1 450MHz desktop by the editors of CNET and #1 Power Desktop by the editors of PC World Magazine (Millennia 400 DVD • October '98, Millennia MAX 450 • PC World "Best Buy" November '98),

Micron's Millennium desktop product line continues a long tradition of industry-leading, award-winning performance. Perhaps that's why some of the most prominent power users around rely on Micron. No matter how strenuous your demands, no matter how colossal the task, we invite you to put a Millennium®

desktop to the test. You'll be hard-pressed to find a Pentium® II processor based system as powerful and affordable as the Micron™ Millennium. And Micron's revolutionary new MPower™ purchase program makes Millennium ownership even easier, offering qualified users no interestSM or payments for six months as well as PowerXchange™ trade-in options on your current Pentium processor-class PC towards a new Millennium desktop.



©1998 Micron Electronics, Inc. All Rights reserved. Micron Electronics is not responsible for omissions or errors in typography or photography. All purchases are subject to availability. Prices and specifications may be changed without notice; prices do not include shipping and handling and any applicable taxes. 3D-ray tracing/jetset gallery does not include retail height and original shipping/handling charges, applies only to Micron brand products and begins from date of shipment. All sites are controlled by Micron Electronics current terms and conditions of sale. On-site service is provided at the discretion of Micron Electronics, Inc. A diagnostic determination for on-site service must be made by a Micron service technician prior to the provision of on-site service. The Intel Inside Logo and Pentium are registered trademarks and Pentium II, Celeron and MMX are trademarks of Intel Corporation. Microsoft, Windows, Windows NT and the Windows logo are registered trademarks of Microsoft Corporation. Product names of Micron products are trademarks or registered trademarks of Micron Electronics, Inc. Other product names used in this publication are for identification purposes only and may be trademarks of their respective companies. Note: actual performance is dependent upon numerous factors and observed transfer rates may be less than the maximum potential. *For all Micron Millennium desktop systems: The CD-ROM drive will be removed upon the purchase of the DVD-ROM drive upgrade. **Test with Data Computers in event customer satisfaction with past six month desktop purchases. Return: 30-Day Return Policy: PCWeek Desktop PC's price. With 3/7/98. *Contact with Micron Service Provider required. Internet service providers must be notified by ISP and is not included. **Trade-in program: Trade-in program is available on a 30-day, same-as-cash and individuals for 6-month same-as-cash program. If purchase software and related charges are not paid by full within 60 days from purchase date for business or within 180 days from purchase date for individuals, finance charges will be assessed from purchase date. APR varies and is 17.99% on all MICRON with a minimum finance charge of \$1.99. Return financing is available to individuals for home or business use. PowerXchange program: Trade-in of old major computer brands. Please call to discuss and the Intel qualified brand list. Cash rebates are based on the average wholesale value of your PC per the Onion Blue Book, or other source chosen by Micron, adjusted by condition of trade-in. A non-refundable up-front freight charge applies for participation in PowerXchange to cover cost of return packaging and processing.

3 The fastest typist in the world types 170 words per minute. To give you some idea of how many words that is, this little blurb is only 30 words long.

4 The newest Micron Millennia features the Intel Pentium II processor 450MHz, the fastest chip available. Don't settle for anything less.

THERE IS NO KNOWLEDGE THAT IS NOT POWER.

— RALPH WALDO EMERSON

12
VOL. 8 SEC. 03
98.12

Now important is a 15% performance differential. Think of it as 1-hour and 12 minutes is an 8-hour day.

New Rules. New Tools.™

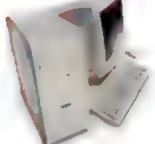
The Micron Difference: Rock-Solid Reliability. MPower™ and PowerXChange™ Programs. Industry-Leading Service and Support.

There's a lot more to owning a system than having a computer sitting on your desk. You'll always want the latest technology, great pricing and service and

support you can count on — and that's exactly what Micron's new MPower program is all about. Call today for details or visit www.micronpc.com/pcmag.



Award-Winning Complete Internet-Ready* 450MHz Systems Starting at Just \$1699

					
Model Name	Millennia C333	Millennia 350	Millennia 450	Millennia 450 MAX	Millennia 450 MAX
Processor	Intel® Celeron® processor 333MHz	Intel Pentium® II processor 350MHz	Intel Pentium II processor 450MHz	Intel Pentium II processor 450MHz	Intel Pentium II processor 450MHz
Cache	128KB internal L2 cache	512KB internal L2 cache	512KB internal L2 cache	512KB internal L2 cache	512KB internal L2 cache
RAM	32MB SDRAM	64MB 100MHz SDRAM	64MB 100MHz SDRAM	128MB 100MHz SDRAM	128MB 100MHz SDRAM
Hard Drive	4.3GB Ultra ATA hard drive*	6.4GB Ultra ATA hard drive*	6.4GB Ultra ATA hard drive*	13.4GB Ultra ATA hard drive*	13.4GB 7200 RPM Ultra ATA hard drive*
Monitor	15" Micron 500Hz monitor (13.8" display)	17" Micron 700Hz monitor (15.9" display)	17" Micron 700Hz monitor (15.9" display)	17" Micron 700Hz monitor (15.9" display)	19" Micron 900Hz monitor (18" display)
DVD/CD-ROM	32X max speed CD-ROM drive	32X max speed CD-ROM drive	32X max speed CD-ROM drive	32X max speed CD-ROM drive	48X DVD-ROM drive
Modem	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**	3Com/U.S. Robotics 56K WinModem**
Graphics	nVidia Vanta 128, 4MB SDRAM 3D AGP graphics	nVidia Vanta 128, 4MB SDRAM 3D AGP graphics	nVidia Vanta 128, 4MB SDRAM 3D AGP graphics	nVidia Vanta 128, 4MB SDRAM 3D AGP graphics	Diamond Viper 550 Ultra 3D, 5MB graphics
Sound System	PCI 64-voice WaveTable sound	PCI 64-voice WaveTable sound	PCI 64-voice WaveTable sound	PCI 64-voice WaveTable sound	PCI 64-voice WaveTable sound
Warranty	3-year/3-year Micron Power Limited warranty	3-year/3-year Micron Power Limited warranty	3-year/3-year Micron Power Limited warranty	3-year/3-year Micron Power Limited warranty	3-year/3-year Micron Power Limited warranty
Software Included	Microsoft® Windows® 98 Microsoft® Home Essentials Norton AntiVirus	Microsoft Windows 98 Microsoft Office 97 Small Business Edition Microsoft Outlook Microsoft Internet Explorer Norton AntiVirus	Microsoft Windows 98 Microsoft Office 97 Small Business Edition Microsoft Outlook Microsoft Internet Explorer Norton AntiVirus	Microsoft Windows 98 Microsoft Office 97 Small Business Edition Microsoft Outlook Microsoft Internet Explorer Norton AntiVirus	Microsoft Windows 98 Microsoft Office 97 Small Business Edition Microsoft Outlook Microsoft Internet Explorer Norton AntiVirus
Also Includes:	New MicroTower case Advent AV009 stereo speakers 104-key enhanced keyboard Micron® IntelliMouse® 3.5" floppy drive	New MicroTower case Advent AV009 stereo speakers 104-key enhanced keyboard Micron® IntelliMouse 3.5" floppy drive	New MicroTower case Advent AV009 stereo speakers 104-key enhanced keyboard Micron® IntelliMouse 3.5" floppy drive	Micron MiniTower case Advent AV009 stereo speakers 104-key enhanced keyboard Micron® IntelliMouse 3.5" floppy drive	Micron MiniTower case Herman H1000 flat panel speakers w/subwoofer 1800MB Jazzy Zip Drive 104-key enhanced keyboard Micron® IntelliMouse 3.5" floppy drive
Price	\$1,249 ^{'44/mo.} TechRefresh Bus. Lease, 36 mos.**	\$1,499 ^{'52/mo.} TechRefresh Bus. Lease, 36 mos.**	\$1,699 ^{'59/mo.} TechRefresh Bus. Lease, 36 mos.** <i>New Low Price*</i>	\$2,499 ^{'87/mo.} TechRefresh Bus. Lease, 36 mos.**	\$2,899 ^{'101/mo.} TechRefresh Bus. Lease, 36 mos.** <i>New Low Price</i>
Upgrade to:	Upgrade to: 64MB SDRAM memory 6.4GB Ultra ATA hard drive 17" Micron 700Hz monitor (15.9" display) 100MB Jazzy Zip drive	Upgrade to: 128MB SDRAM memory 10GB Ultra ATA hard drive 17" Micron TriTone 700Hz monitor (16" display) 100MB Jazzy Zip drive	Upgrade to: 128MB SDRAM memory 13.4GB Ultra ATA hard drive 19" Micron 900Hz monitor (18" display) 48X DVD-ROM drive	Upgrade to: 100MB Jazzy Zip drive Herman H1000 flat panel speakers w/subwoofer 19" Micron TriTone monitor (18" display)	Upgrade to: 256MB 100MHz SDRAM Microsoft Natural Keyboard Elite
Price	\$1,545 ^{'54/mo.} TechRefresh Bus. Lease, 36 mos.**	\$1,932 ^{'68/mo.} TechRefresh Bus. Lease, 36 mos.**	\$2,232 ^{'78/mo.} TechRefresh Bus. Lease, 36 mos.** <i>New Low Price*</i>	\$2,866 ^{'100/mo.} TechRefresh Bus. Lease, 36 mos.**	\$3,214 ^{'112/mo.} TechRefresh Bus. Lease, 36 mos.** <i>New Low Price</i>



*Contract with outside Internet Service Provider required. Internet service questions must be resolved by ISP and is not included.

ORDER DIRECT 1-888-669-0974
Call us toll-free or order online at www.micronpc.com/pcmag

Planes that cost millions of dollars have "mechanical

failure." Two airport hotdogs is too many. I played 18

holes between spreadsheets. I wonder where they're all

going? When you say it over and over again, "delay" starts

to sound funny. Lying down would be good. Three dollars

M

VOL. 6, SEC. 01
98.12

DELAYED



**"FOR STANDING UP TO THE VAGARIES OF TRAVEL,
THE MICRON GOBOOK IS THE BEST BET GOING."**

CHIEF "EDITOR" JIMMYE BART WITH/UNPORTABLE, MAY '98

GOBOOK²



New Rules. New Tools.TM

You don't get to recharge your batteries every four hours. You don't get to rest whenever you feel like it. Why should your notebook? Life on the road is no cake walk and your notebook should be designed to endure the rigors of mobile life as well as you do. Introducing the GoBook notebook. With a revolutionary modular battery design, lightning-fast performance featuring the fastest Intel® Pentium® II processors, and an incredibly thin and light package, it's the ultimate companion for those who stop at nothing to succeed. It's no wonder that *CNET* awarded the GoBook Editors' Choice for best UltraPortable on the market, saying, "For standing up to the vagaries of travel, the Micron GoBook is the best bet going."

©1998 Micron Electronics, Inc. All Rights reserved. Micron Electronics is not responsible for omissions or errors in typography or photography. All purchases are subject to availability. Prices and specifications may be changed without notice; prices do not include shipping and handling and any applicable taxes. 30-day money-back policy does not include return freight and original shipping/handling charges; applies only to Micron brand products and begins from date of shipment. All sales are controlled by Micron Electronics' current terms and conditions of sale. On-site service is provided at sole discretion of Micron Electronics, Inc. A diagnostic determination for on-site service must be made by a Micron service technician prior to the provision of on-site service. The Intel Inside Logo and Pentium are registered trademarks and Pentium II, Celeron and MMX are trademarks of Intel Corporation. Microsoft, Windows, Windows NT and the Windows logo are registered trademarks of Microsoft Corporation. Product names of Micron products are trademarks or registered trademarks of Micron Electronics, Inc. Other product names used in this publication are for identification purposes only and may be trademarks of their respective companies. Retail advertised configurations may differ from those shown. *All hard drive sizes simulated with 1GB equal to 1 billion bytes. **Used with Dell Computers in recent customer satisfaction with just an month desktop purchase. Source: Ziff-Davis BrandTrack study, PCWeek Desktop PCs panel, Nov 5 7/19/98. ***System World Mobile Class not available with Windows NT. *Weight without base battery. **Rechargeable battery prices are based on a 30-month lease and are available to business customers. Businessmen can qualify for 30-day same-as-cash and individuals for 6-month same-as-cash programs. If purchase advances and related charges are not paid in full within 90 days from purchase date for business or within 180 days from purchase date for individuals, finance charges will be assessed from purchase date. APR varies and is 17.99% as of 8/25/98 with a minimum finance charge of \$1.88. Term financing is available to individuals for home or business use. Power/Exchange concepts trade in of most major computer brands. Please call for details and the latest qualified brand list. Cash rebates are based on the average wholesale value of your PC per the Orion Blue Book, or other source chosen by Micron, adjusted for condition at trade-in.

A non-refundable up-front freight charge applies for participation in Power/Exchange to cover cost of return packaging and processing.

is a lot for water. Solitaire is actually pretty fun for about a

minute. That person looks like somebody I know. I'm actually

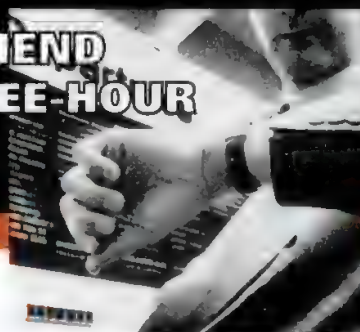
excited about this prospect of getting on a plane. Why isn't my

cell phone working? That kid keeps staring at my GoBook. This

is better than being in the office. I guess. What's that smell?



YOUR ONLY FRIEND DURING A THREE-HOUR LAYOVER



12
VOL. 6 SEC. 03
98 12

"It's not enough to be busy. The question is what we are busy about."

"...my Dear Friend..."

"The GoBook outperformed every other machine in our review by a sizable margin" CNET, Editors' Choice, Best UltraPortable Reviewed, May '98



Here's the GoBook difference: Featuring the fastest Intel Pentium and Pentium II processors

• Preloaded with Microsoft's Windows 98 • Includes a big active matrix 12.1" SVGA display powered

by 128-bit graphics accelerator • A revolutionary modular battery design that performs as well traveling

across town as it does across the Atlantic Ocean • Big room for expandability: The GoBook includes both a 24X CD-ROM drive and a 3.5"

floppy drive • All in a super thin and light package that starts at just 1.35" thin and 4.4lbs.*



Micron's Award-Winning GoBook Now Starts at Just \$1,799



Model Name	GoBook™ 233	GoBook ² 266	New! GoBook ² 300
Processor	Intel® Pentium® processor with MMX™ technology 233MHz	Intel Pentium II processor 266MHz	Intel Pentium II processor 300MHz
Cache	912KB L2 pipeline burst cache	512KB L2 pipeline burst cache	512KB L2 pipeline burst cache
RAM	64MB EDO DRAM	32MB EDO DRAM	32MB EDO DRAM
Hard Drive	3.2GB hard drive*	3.2GB hard drive*	3.2GB hard drive*
Monitor	12.1" SVGA display	12.1" SVGA display	12.1" SVGA display
CD-ROM	24X CD-ROM drive	24X CD-ROM drive	24X modular CD-ROM drive
Graphics	2MB/128-bit graphics accelerator	2MB/128-bit graphics accelerator	2MB/128-bit graphics accelerator
Sound System	16-bit stereo/Wavetable sound	16-bit stereo/Wavetable sound	16-bit stereo/Wavetable sound
Warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty
Software Included	Microsoft® Windows® 98 System Wizard Mobile Client™™™ Norton AntiVirus	Microsoft Windows 98 System Wizard Mobile Client™™™ Norton AntiVirus	Microsoft Windows 98 System Wizard Mobile Client™™™ Norton AntiVirus
Also Includes:	Bay battery 4.4lbs (w/floppy drive)* 6.7lbs (w/opt./base battery & floppy) USB, parallel, serial, VGA, PS/2, NTSC/S-Video ports MPEG compatible CardBus/Zoomed Video ready Microphone, stereo line-in/out jacks 2 Type II/1 Type III PCMCIA slots 2-way infrared port Touchpad pointing device 3.5" modular floppy drive • Add SuperBase Battery for \$299	Bay battery 4.4lbs (w/floppy drive)* 6.7lbs (w/opt./base battery & floppy) USB, parallel, serial, VGA, PS/2, NTSC/S-Video ports MPEG compatible CardBus/Zoomed Video ready Microphone, stereo line-in/out jacks 2 Type II/1 Type III PCMCIA slots 2-way infrared port Touchpad pointing device 3.5" modular floppy drive • Add SuperBase Battery for \$299	Bay battery 4.4lbs (w/floppy drive)* 6.7lbs (w/opt./base battery & floppy) USB, parallel, serial, VGA, PS/2, NTSC/S-Video ports MPEG compatible CardBus/Zoomed Video ready Microphone, stereo line-in/out jacks 2 Type II/1 Type III PCMCIA slots 2-way infrared port Touchpad pointing device 3.5" modular floppy drive • Add SuperBase Battery for \$299
Price	\$1,799 \$63/mo. TechRefresh Bus. Lease, 36 mos.** <i>New Low Price!</i>	\$1,999 \$70/mo. TechRefresh Bus. Lease, 36 mos.**	\$2,899 \$101/mo. TechRefresh Bus. Lease, 36 mos.**



PC WORLD NAMES MICRON'S GOBOOK AS ONE
OF THE TOP FIVE POWER NOTEBOOKS AVAILABLE!

8/98

ORDER DIRECT 1-888-669-0974

Call us toll-free or order online at www.micronpc.com/pcmag

Choose 013 at www.pcmag.com/infolink

IBM PC 300PL (450), PC 300PL (400)

300PL: Pentium II/450, 8.6GB disk, 17-inch monitor, SDRAM; High-End Winstone: 28.1. \$2,770 street. **300PL:** Pentium II/400, 6.1GB disk, 17-inch monitor, EDO DRAM; Business Winstone: 18.6. \$2,100 street. Research Triangle Park, NC; 800-426-7255; www.ibm.com/pc/us; 520 at www.pcmag.com/infolink.

• IBM is certainly a leader in the managed PC market, and these two PCs would ably fill most enterprise needs. The two 300PLs come with easy-to-service, tool-free cases, as well as a

number of robust and unique management tools. The only problem: Though IBM claims that both PCs ship with LANDesk Client Manager 3.3 and provide native Alert on LAN technology, the units came to us with Version 3.1 of LDCM, which lacks Alert on LAN.

Aside from standard asset data gathering and hardware monitoring, these machines are augmented with management technologies unique to IBM: AssetID, SMART Reaction, the

Universal Management Agent (UMA), and LAN Client Control Manager (LCCM). An Asset ID EEPROM stores the PC's important inventory information; using a hand-held Asset ID radio-frequency unit (available from third parties this fall), you can ease inventory procedures by writing to and reading from the EEPROM without ever opening the system. SMART Reaction anticipates SMART disk failures, then automatically backs up your data before fail-

SUMMARY OF FEATURES

Corporate PCs

PC MAGAZINE
EDITOR'S CHOICE

■ YES ■ NO

Products listed in review order

	AcerPower 8600	ACMA nPower 6400	ACMA nPower 6333	ACT Brilliance P611-400HC	ACT Brilliance P611-400MC	Axis Metropolis GX5 400	Axis Metropolis NX5 300	Compaq Deskpro EN 450
Category	High-end	High-end	Mainstream	High-end	Mainstream	High-end	Mainstream	High-end
Price of tested configuration	\$2,250 street	\$2,298 direct	\$1,795 direct	\$2,088 direct	\$1,998 direct	\$1,999 direct	\$1,099 direct	\$2,670 street
Processor	Pentium II/450	Pentium II/400	Pentium II/333	Pentium II/400	Pentium II/400	Pentium II/400	Pentium II/300	Pentium II/450
Installed/maximum SDRAM	128MB / 384MB	128MB / 384MB	64MB / 384MB	128MB / 768MB	64MB / 768MB	128MB / 384MB	64MB / 384MB	128MB / 384MB
Installed L2 pipelined-burst cache	512K	512K	512K	512K	512K	512K	512K	512K
Motherboard manufacturer	Acer	AMC	Intel	Asus	Asus	Asus	Asus	Compaq
Chip set	Intel 440BX	Intel 440BX	Intel 440LX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440LX	Intel 440BX
BIOS version and/or date	Acer 3.1	Phoenix 4.0	Phoenix 4.0	Award 4.51PG	Award 4.51PG	Award 4.51PG	Award 4.51PG	Compaq 35977
Hard disk	8.0GB Maxtor 90840D6	9.6GB IBM DTTA-371010	9.6GB IBM DTTA-371010	9.6GB IBM DTTA-371010	9.6GB IBM DTTA-371010	8.0GB IBM DHEA-38451	4.1GB Western Digital Caviar AC34300	9.6GB IBM DTTA-371010
Graphics and Multimedia								
Graphics adapter	STB LightSpeed 740 AGP (8MB SGRAM)	Motherboard AGP (4MB SGRAM)	ATI Xpert@Play PCI (4MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Diamond Stealth II G460 AGP (8MB SDRAM)	Diamond Stealth 3D 4000 Turbo AGP (4MB SGRAM)	Matrox Millennium G200 AGP (8MB SDRAM)
Graphics chip set	Intel i740	ATI 3D Rage Pro Turbo AGP 2X	ATI 3D Rage Pro Turbo AGP 2X	Matrox MGA-G200	Matrox MGA-G200	Intel i740	S3 Virge GX2	Matrox MGA-G200
Monitor	Acer 7279g	Impression Vienna Pro 75	Impression7 Plus	CyberVision C70	CyberVision C70	CTX VL950	CTX VL500	Compaq V75
Claimed/measured diagonal size, in inches	17 / 15.5	17 / 16.0	17 / 15.6	17 / 16.0	17 / 16.0	19 / 18.0	15 / 13.9	17 / 16.0
CD-ROM drive	32X Acer CD-932E	32X Toshiba XM-6202B	32X Toshiba XM-6202B	40X AOpen C40E/AKU	40X AOpen C40E/AKU	32X Toshiba XM-6202B	32X Toshiba XM-6202B	32X Compaq CR-588 BCO
Sound device (interface)	Integrated Crystal CS4237B (ISA)	Integrated Crystal CS4235 (ISA)	Integrated Yamaha OPL3-Sax (PCI)	Creative Labs AWE64 Value (ISA)	Creative Labs AWE64 Value (ISA)	Creative Labs Ensoniq AudioPCI (PCI)	Creative Labs Ensoniq AudioPCI (PCI)	Integrated Ensoniq ES1371 (ISA)
Audio synthesis	FM, wavetable	FM	FM	Wavetable	Wavetable	Wavetable	Wavetable	FM, wavetable
Networking and Manageability								
DMI browser	Intel LANDesk Client Manager 3.3	Present Client System Management	Present Client System Management	Intel LANDesk Client Manager 3.12	Intel LANDesk Client Manager 3.12	Intel LANDesk Client Manager 3.12	Intel LANDesk Client Manager 3.12	Insight Manager
LAN wake-up/Remote power-on/power-off	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
Remote BIOS update/component locking	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
10/100-Mbps network adapter (interface)	Integrated Intel Ether Express Pro (PCI)	Integrated Intel Ether Express Pro (PCI)	Integrated Intel Ether Express Pro (PCI)	Intel Ether Express Pro (PCI)	Intel Ether Express Pro (PCI)	Integrated Intel Ether Express Pro (PCI)	3Com Fast Ethernet XL (PCI)	Intel Ether Express Pro (PCI)
Expandability								
Expansion-bus slots	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 1 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 1 PCI, 1 PCI/ISA, 0 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	0 ISA, 2 PCI, 2 PCI/ISA, 1 AGP
Front-accessible drive bays (5.25" / 3.5")	3 / 2	1 / 2	1 / 2	3 / 2	3 / 2	3 / 2	3 / 2	2 / 1
Internal drive bays (5.25" / 3.5")	0 / 2	0 / 1	0 / 1	0 / 3	0 / 3	0 / 1	0 / 1	0 / 0
Parallel/serial/USB ports	1 / 2 / 2	1 / 2 / 2	1 / 2 / 1	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2
Power-supply wattage	200	200	200	235	235	235	235	200
Service and Support								
24-hour, 7-day technical support	■	■	■	■	■	■	■	■
Standard warranty on parts/labor	3 years/3 years included	3 years/1 year included	3 years/1 year included	1 year/1 year \$39	1 year/1 year \$39	3 years/3 years included	3 years/3 years included	3 years/1 year included
On-site service charge for 1 year	■	■	■	■	■	■	■	■
24-hour turnaround for parts replacement	■	■	■	■	■	■	■	■

IBM garnered top scores on our Service and Reliability Survey. Both systems posted average to above-average test results.—CM

Powerman Workstation: Pentium II/400, 8GB disk, 17-inch monitor, SDRAM; High-End Winstone 99: 22.9. **\$1,595 direct.** **Executive Workstation:** Pentium II/400, 8GB disk, 15-inch monitor, SDRAM; Business Winstone 99: 18.4. **\$1,495 direct.** Irwindale, CA; 800-888-6294, 626-815-7777; www.maximusp.com; 523 at www.pcmag.com/infolink.

software necessary to make them true corporate PCs. The units came in non-lockable cases, and neither offered an intrusion detector. Both had Intel LANDesk Management Suite 6.1, an extensive package used for managing other PCs from a server (this is a \$599 option, not included in the above price), instead of the workstation version of LANDesk Client Manager or another DMI utility.

The PCs posted mostly average scores.

Continues

DECEMBER 1, 1998 PC MAGAZINE 177

**We've enhanced our
manageability
suite to enhance
your position in
the executive suite.**

©1998 NEC Computer Systems Division, Packard Bell NEC, Inc. NEC and PowerMate are registered trademarks of NEC Corporation, used under license. NEC NOW is a service mark of Packard Bell NEC, Inc. Products and specifications are subject to change without notice. Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation. Intel, the Intel Inside logo, LANDesk and Pentium are registered trademarks and Celeron is a trademark of Intel Corporation. All other trademarks are property of their respective owners. Dept. No. PM938A

PowerMate® 8100 Series

- High performance with manageability for the networked enterprise
- Intel® Pentium® II processor, 350MHz, 400MHz or 450MHz with 512K L2 cache OR Intel Celeron™ processor, 300MHz or 333MHz with 128K L2 cache
- 3.2GB-14.4GB Ultra DMA 33 EIDE hard drive OR 4.5GB-9.1GB Ultra Wide SCSI hard drive
- 4-8MB AGP graphics
- 3Com® 3C905 10/100 network interface with Wake-On LAN support
- Microsoft® Windows NT® Workstation 4.0, Windows® 95 or Windows 98 operating system
- NLX minitower or space-saving desktop chassis

Prices starting at \$1349

Upper management is demanding lower cost of ownership and greater uptime.

Now you can deliver thanks to the NEC PowerMate Series, a range of industry-standard corporate systems designed with manageability and networking in



mind. For high-end performance, the NEC

PowerMate 8100 Series features Intel's

Pentium II processor 450MHz (the fastest Pentium II processor available)

and Intel's 440BX chipset for maximum

power to drive all your demanding

database and graphics-intensive

applications. If lower cost of owner-

ship is your number one priority, consider the space-saving PowerMate 5100 Series.

Easily managed, this PowerMate Series features Intel Celeron processors 300MHz and 333MHz with integrated 128K Level 2 cache (running at full processor speed);

ideal for word processing, presentations, e-mail and Internet access. Both the

PowerMate 8100 and 5100 Series feature Wake-On LAN support, easy-to-service

chassis designs, and an enhanced manageability suite of tools including Intel

LANDesk® Client Manager – a DMI browser for real-time alerting, PC health

monitoring, asset management and remote access ability. We've also included

NEC WebTelligent™ software for remote enterprise

management over the Internet/intranet. In short,

every tool to help you manage your network, and

therefore your career, better.

For more information call

us at 1-888-863-2669 or visit

us at www.necnow.com



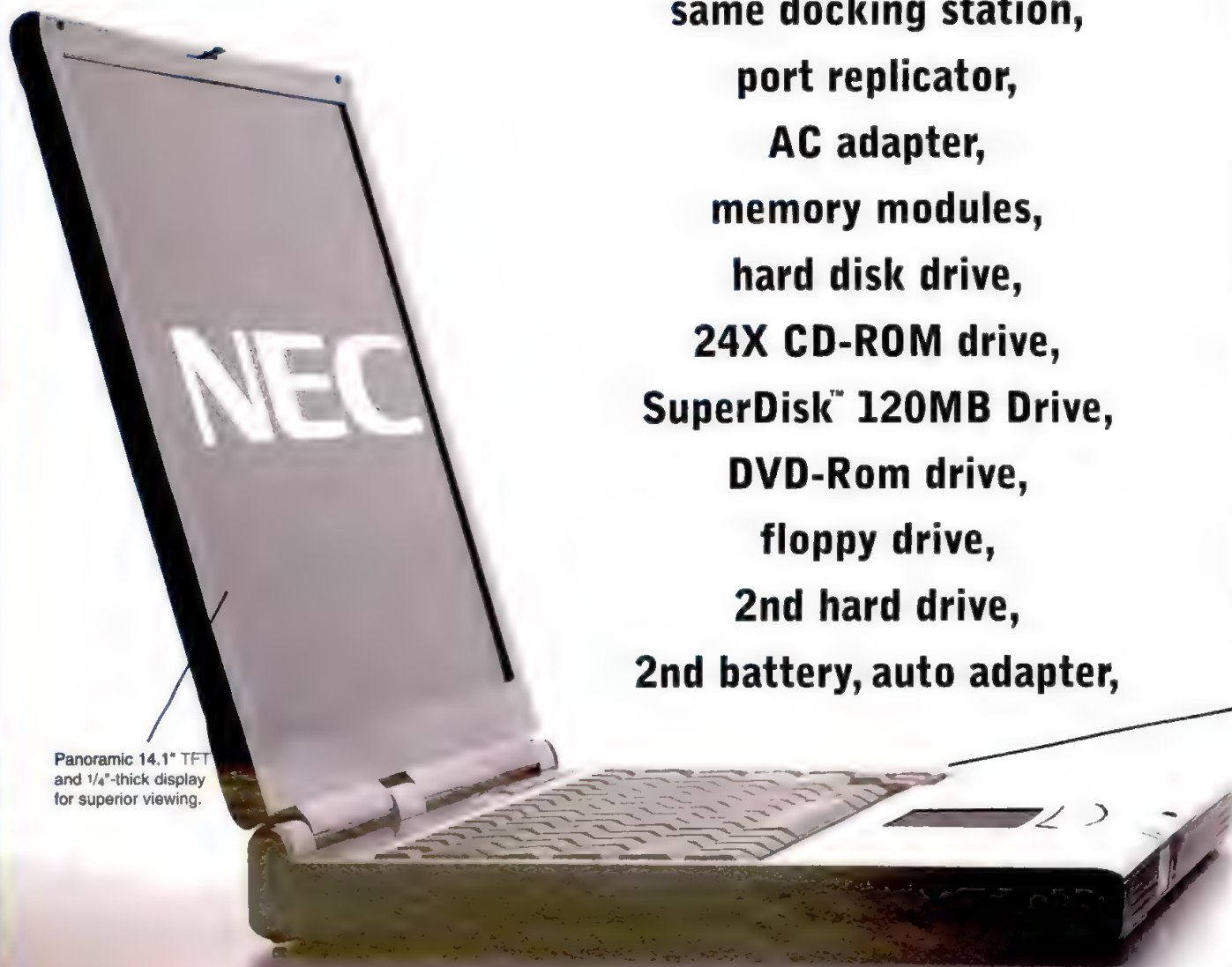
PowerMate 5100 Series

- Value and comprehensive manageability in a space-saving design
- Intel Pentium II processor, 333MHz with 512K L2 cache OR Intel Celeron processor, 300MHz or 333MHz with 128K L2 cache
- 2.1GB-8.0GB Ultra DMA 33 EIDE hard drive
- 2MB AGP graphics
- 3Com 3C905 10/100 network interface with Wake-On LAN support
- Microsoft Windows NT Workstation 4.0, Windows 95 or Windows 98 operating system
- Space-saving NLX desktop chassis

Prices starting at \$939

NEC

**It's a family of
notebooks that shares the
same docking station,
port replicator,
AC adapter,
memory modules,
hard disk drive,
24X CD-ROM drive,
SuperDisk™ 120MB Drive,
DVD-Rom drive,
floppy drive,
2nd hard drive,
2nd battery, auto adapter,**



Panoramic 14.1" TFT
and 1/4"-thick display
for superior viewing.

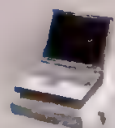
NEC Versa SX

An incredibly thin and light
full-featured Pentium® II processor-based modular notebook
(1.3" thin and as light as 4.8 lbs.).

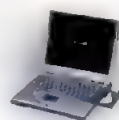


Announcing the notebook family with completely interchangeable parts.

Never before has an NEC family of notebooks had this much in common. With everything from swappable battery packs to universal docking stations, the Versa® family offers a high level of cross-compatibility. This extraordinary family even shares industry-leading display technology that gives you 13.3" or 14.1" TFT displays,



Docking Station



Modular
VersaBay III for
all bay devices

©1998 NEC Computer Systems Division. Packard Bell, NEC and Versa are registered trademarks of NEC Corporation. VersaBay and PortBar are trademarks of NEC Corporation. All are used under license. Prices and product specifications are subject to change without notice. This advertisement and Pentium are registered trademarks of Intel Corporation. All other trademarks and registered trademarks are the property of their respective owners.

and the same logo.

Modular VersaBay™ III -
provides ultimate versatility, allowing
you to swap any one of seven components
to meet your changing needs.



*PC Magazine Editors' Choice,
August 1998 Blockbuster Issue.*

NEC Versa LX

A powerful desktop replacement
with mega-capacity hard drives, the fastest mobile
Pentium II processors, and 3-D graphics chip set.

Built-in floppy or SuperDisk
120MB Drive for the storage
capacity you require

which consume 20% less power, are 20% lighter, and are 33% thinner than previous LCDs.

What's more, you get all this for a starting price of just \$2399. So when you consider how

many remarkable innovations Versa notebooks have in common,

it's no wonder they also share the same logo — NEC.

For more information, simply call us or visit our website today.



Port Replicator



AC Adapter



1-888-863-2669 www.necnow.com/LXSX/

NEC

Choose 154 at www.pcmag.com/infolink

PCs Corporate PCs

Toll-free technical support for units under warranty is available around the clock; support for out-of-warranty PCs is available during business hours, six days.—*RSA*

Mega Impact PII 400 128MX, PII 333 64MX

PII 400 128MX: Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM; High-End Winstone: 23.5. \$2,000 street. **PII 333 64MX:** Pentium II/333, 6.2GB disk, 17-inch monitor, SDRAM; Business Winstone: 16.4. \$1,500 street. San

Diego, CA; 800-338-6628, 619-487-8888; www.megacs.com; 524 at www.pcmag.com/infolink.

• Mega Computer's Impact machines make not only poor managed PCs but poor PCs in general. When the units arrived at PC Labs, their CPUs were overclocked, which can cause system damage and voids the part's warranty (we reset the clock before testing). Expansion cards were dislodged, and much of the internal cabling was disconnected. Fur-

ther, the units lacked a tool-free chassis and did not have extensive remote management. Both had Version 3.3 of Intel LANDesk Client Manager installed, but it was poorly configured. The 64MX gathered minimal inventory information and gave vague and sometimes confusing hardware alerts; the 128MX could read no DMI data whatsoever.

Both PCs have problematic chassis: The backplane on which the motherboard sits is

SUMMARY OF FEATURES

Corporate PCs

PC MAGAZINE
EDITORS' CHOICE

PC MAGAZINE
EDITORS' CHOICE

■ YES ■ NO

Products listed in review order

	GST Celestial Storm 400N	GST Celestial Storm 333N	HP Vectra VL Series 8 HE	HP Vectra VE Series 8	Highwave Scorpion 400	Highwave Tercel 300	HiQ Impact Pro	HiQ Impact Elite
Category	High-end	Mainstream	High-end	Mainstream	High-end	Mainstream	High-end	Mainstream
Price of tested configuration	\$2,195 direct	\$1,549 direct	\$2,950 street	\$1,680 street	\$1,769 direct	\$989 direct	\$2,059 direct	\$999 direct
Processor	Pentium II/400	Pentium II/333	Pentium II/450	Celeron/333	Pentium II/400	AMD K6-2/300	Pentium II/400	AMD K6-2/300
Installed/maximum SDRAM	128MB / 384MB	64MB / 384MB	128MB / 768MB	64MB / 768MB	128MB / 768MB	84MB / 768MB	128MB / 768MB	64MB / 384MB
Installed L2 pipelined-burst cache	512K	512K	512K	512K	512K	512K	512K	512K
Motherboard manufacturer	Intel	Intel	HP	HP	FreeTech	FreeTech	Asus	Asus
Chip set	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	ALI M1542	Intel 440BX	Intel 430TX
BIOS version and/or date	Phoenix 4.0	Phoenix 4.0	Phoenix 4.0	AMI DMI 2.0	Award 4.51PG	Award 4.51PG	Award 4.51PG	Award 4.51PG
Hard disk	6.2GB Seagate Medalist Pro ST36530A	4.3GB Seagate Medalist Pro ST34520A	9.6GB IBM DTTA-371010	4.1GB Quantum Fireball SE 4.3A	6.1GB Quantum Fireball SE 6.4A	4.1GB Quantum Fireball SE 4.3A	9.6GB IBM DTTA-371010	4.1GB IBM DHEA-34331

Graphics and Multimedia

Graphics adapter	ATI Xpert@Work AGP (8MB SGRAM)	ATI Xpert@Work AGP (8MB SGRAM)	Motherboard AGP (8MB SGRAM)	Matrox Productiva AGP (4MB SDRAM)	Diamond Viper 330 AGP (8MB SGRAM)	Diamond Viper 330 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Mystique 220 PCI (4MB SGRAM)
Graphics chip set	ATI 3D Rage Pro Turbo AGP 2X	ATI 3D Rage Pro Turbo AGP 2X	Matrox MGA-G200	Matrox MGA-G100	nVidia RIVA 128	nVidia RIVA 128	Matrox MGA-G200	Matrox MGA-1164SG
Monitor	ViewSonic E771	ViewSonic E771	HP 70	HP 70	Shamrock C707-D	Shamrock C70	Panasonic E70	Panasonic P50
Claimed/measured diagonal size, in inches	17 / 16.0	17 / 16.0	17 / 15.5	17 / 15.5	17 / 15.7	15 / 13.8	17 / 15.75	17 / 15.5
CD-ROM drive	32X Toshiba XM-6202B	32X Toshiba XM-6202B	4.8X DVD Toshiba SDM-1202	32X Hitachi CDR-8430	32X Mitsumi FX320S	32X Mitsumi FX320S	32X Toshiba XM-6202B	32X Toshiba XM-6202B
Sound device (interface)	Integrated Crystal CS4236B (PCI)	Integrated Crystal CS4236B (PCI)	Creative Labs Sound Blaster 16 Pro (PCI)	AzTech AZT-1008 (ISA)	Creative Labs Ensoniq AudioPCI (PCI)	Creative Labs Ensoniq AudioPCI (PCI)	SIIG SoundWave Pro (PCI)	SIIG SoundWave Pro (PCI)
Audio synthesis	Wavetable	Wavetable	FM	FM, wavetable	Wavetable	Wavetable	Wavetable	Wavetable

Networking and Manageability

DMI browser	Intel LANDesk Client Manager 3.1	Intel LANDesk Client Manager 3.1	HP TopTools 4.0	HP TopTools 4.0	Intel LANDesk Client Manager 3.2	Intel LANDesk Client Manager 3.2	Intel LANDesk Client Manager 3.2	Intel LANDesk Client Manager 3.2
LAN wake-up/Remote power-on/power-off	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
Remote BIOS update/component locking	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
10/100 Mbps network adapter (interface)	Intel Ether Express Pro (PCI)	3Com 3C9058TX (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)	Intel Ether Express Pro (PCI)	Intel Ether Express Pro (PCI)

Expandability

Expansion-bus slots	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 1 PCI, 3 PCI/ISA, 1 AGP	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 2 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	3 ISA, 3 PCI, 1 PCI/ISA, 0 AGP
Front-accessible drive bays (5.25 / 3.5)	3 / 2	3 / 2	3 / 1	3 / 1	3 / 2	3 / 2	3 / 2	2 / 1
Internal drive bays (5.25 / 3.5)	0 / 3	0 / 3	0 / 2	0 / 2	0 / 2	0 / 2	0 / 2	0 / 2
Parallel/serial/USB ports	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 1 / 0	1 / 2 / 2	1 / 2 / 2
Power-supply wattage	235	235	150	200	235	230	300	235

Service and Support

24-hour, 7-day technical support	■	■	■	■	■	■	■	■
Standard warranty on parts/labor	3 years/1 year Included	3 years/1 year Included	3 years/1 year Included	3 years/1 year Included	3 years/3 years \$65	3 years/3 years \$65	3 years/1 year \$35	3 years/1 year \$35
On-site service charge for 1 year	■	■	■	■	■	■	■	■
24-hour turnaround for parts replacement	■	■	■	■	■	■	■	■

N/A—Not applicable: The product does not have this feature.

unstable, causing the expansion cards to pop out of their slots if you screw them in. Mega is correcting this.—CM

Micron ClientPro 450, 350

ClientPro 450: Pentium II/450, 13.8GB disk, 19-inch monitor, SDRAM; High-End Winstone 99: 28.4. \$2,797 direct.

ClientPro 350: Pentium II/350, 4.1GB disk, 17-inch monitor, SDRAM; Business Winstone 99: 16.9. \$2,063 direct.
Nampa, ID; 888-634-8799, 208-893-3343; www.micronpc.com; 524 at www.pcmag.com/infolink.

• Micron offers a broad range of service programs for corporate customers, including parts stocking, custom software downloads, and dedicated technical-support contacts. Although suitable for the corporate space, the Micron ClientPro 350 and 450 don't quite meet the high level of system manageability and serviceability that the Compaq and HP units offer. A moderate performer, the ClientPro 350 is a conventional productivity PC. The high-

end ClientPro 450, a performance PC for graphics and Internet design applications, has greater expansion capability.

Both PCs came with LANDesk Client Manager 3.3, which reported asset data, voltage, and temperature. Remote rebooting worked fine, but the ClientPro 350 didn't respond to the chassis intrusion switch and didn't reset correctly after reporting a drop in fan speed. The ClientPro 450 had neither problem.—BB

See www.pcmag.com for interactive views

Continues

IBM PC 300PL	IBM PC 300PL	Maximus Powerman Workstation	Maximus Executive Workstation	Mega Impact PII400 128MB	Mega Impact PII333 64MB	Micron ClientPro 450	Micron ClientPro 350	MidWest Micro Business Solutions WKP-450	MidWest Micro Business Solutions WKP-350
High-end	Mainstream	High-end	Mainstream	High-end	Mainstream	High-end	Mainstream	High-end	Mainstream
\$2,778 street	\$2,100 street	\$1,595 direct	\$1,495 direct	\$2,000 street	\$1,500 street	\$2,797 direct	\$2,063 direct	\$3,249 direct	\$1,799 direct
Pentium II/450	Pentium II/400	Pentium II/400	Pentium II/400	Pentium II/400	Pentium II/333	Pentium II/450	Pentium II/350	Pentium II/450	Pentium II/350
128MB / 384MB	64MB / 384MB EDO DRAM	128MB / 768MB	64MB / 768MB	128MB / 384MB	64MB / 384MB	128MB / 384MB	64MB / 256MB	128MB / 512MB	64MB / 384MB
512K	512K	512K	512K	512K	512K	512K	512K	512K	512K
IBM	IBM	Intel	Intel	Supernano	Supernano	Intel	Micron	Micro-Star	Intel
Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX
IBM level 25	IBM level 25	Phoenix 4.0	Phoenix 4.0	AMI DMI 2.5	AMI DMI 2.5	Phoenix 4.0	Award 4.51PG	AMI DMI 1.1	Phoenix 4.0
8.6GB Seagate ST39140A	6.1GB Maxtor 66480D6	8.0GB IBM DHEA-38451	8.0GB IBM DHEA-38451	9.6GB IBM DTTA-371010	6.2GB Seagate ST36530A	13.8GB IBM DTTA-371440	4.1GB Maxtor 90432D3	13.8GB IBM DTTA-371440	8.0GB Quantum Fireball SE 8.4A
Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	ATI Xpert@Work AGP (8MB SGRAM)	Matrox Productiva AGP (8MB SDRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	Diamond Viper V330 AGP (4MB SGRAM)	Motherboard AGP (4MB SGRAM)	Matrox Millennium G200 AGP (8MB SGRAM)	STB Velocity 128 AGP (8MB SGRAM)
Matrox MGA-G200	Matrox MGA-G200	ATI 3D Rage Pro Turbo AGP 2X	Matrox MGA-G100	Matrox MGA-G200	Matrox MGA-G200	nVidia RIVA 128	nVidia RIVA 128	Matrox MGA-G200	nVidia RIVA 128
IBM P72	IBM P72	Maximus L7031LD	Maximus L5011LD	MGC-1765N	MGC-1765N	Micron 900Lx	Micron 700VX	Clearmax CM-1726	Clearmax CM-1726
17 / 16.5	17 / 16.5	17 / 16.2	15 / 14.0	17 / 15.6	17 / 15.6	19 / 17.5	17 / 16.5	17 / 15.8	17 / 15.8
32X Sanyo CRD-1332	32X Sanyo CRD-1332	32X Sony CDU-711	32X Sony CDU-711	32X Toshiba XM-6202B	32X Toshiba XM-6202B	32X Sony CDU-701	32X Sony CDU-701	32X Pioneer DR-544	32X Pioneer DR-544
Integrated Crystal CS4235 (ISA)	Integrated Crystal CS4235 (ISA)	Integrated Crystal Audio 4611 (PCI)	Integrated Crystal Audio CS4611 (PCI)	Creative Labs Ensoniq AudioPCI (PCI)	Creative Labs Ensoniq AudioPCI (PCI)	Integrated Crystal Audio CS4611 (PCI)	Integrated ESS Technology ES1968 (PCI)	Creative Labs Ensoniq AudioPCI (PCI)	Creative Labs Ensoniq AudioPCI (PCI)
FM	FM	Wavetable	Wavetable	Wavetable	Wavetable	Wavetable	FM, wavetable	Wavetable	Wavetable
Intel LANDesk Client Manager 3.1	Intel LANDesk Client Manager 3.1	Intel LANDesk Client Manager 3.3	Intel LANDesk Client Manager 3.3	Intel LANDesk Client Manager 3.3	Intel LANDesk Client Manager 3.3	Intel LANDesk Client Manager 3.3	Intel LANDesk Client Manager 3.3	Intel LANDesk Client Manager 3.1	Intel LANDesk Client Manager 3.1
■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■
Integrated IBM Etherjet (PCI)	Integrated IBM Etherjet (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)
1 ISA, 2 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 2 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 2 PCI, 1 AGP	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP
2 / 1	2 / 1	3 / 1	3 / 1	3 / 2	3 / 2	2 / 3	2 / 1	6 / 2	4 / 1
0 / 1	0 / 1	0 / 2	0 / 2	0 / 1	0 / 1	0 / 2	0 / 1	0 / 1	0 / 2
1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2
150	145	230	230	250	250	235	145	300	235
■	■	■	■	■	■	■	■	■	■
3 years/1 year Included	3 years/1 year Included	3 years/1 year N/A	3 years/1 year N/A	2 years/2 years \$65 (San Diego area only)	2 years/2 years \$65 (San Diego area only)	3 years/1 year Included	3 years/1 year Included	3-5 years/3 years Included	3-5 years/3 years Included
■	■	■	■	■	■	■	■	■	■

**IBM, HP, Gateway, Apple,
and Micron Electronics**

use our memory...

Now you can, too.

We make the memory that the best PC manufacturers install in their original systems.
Now you can upgrade with the same, genuine memory that the major PC makers install.

Through Crucial Technology, you can buy memory upgrades direct from the factory of
the largest memory manufacturer in the country—our parent company, Micron Technology.

IBM, HP, Gateway, Apple, and Micron Electronics have installed more than
30 million megabytes of Micron RAM. They trust us to deliver the quality you demand.
And now that you demand more speed and performance, but want the same reliability
and compatibility, call **Crucial Technology**.



Not all RAM is created equal.

There's a reason the major PC manufacturers specify our memory.

Call toll free

1-877-491-0040

Order on-line for a discount: www.crucial.com

Crucial Technology, a Division of Micron

1455 Emerald Street, Boise, Idaho, 83704. 208-363-5500 phone, 208-363-5561 fax. E-mail: crucial.sales@micron.com

Copyright 1998 Micron Semiconductor Products, Inc. All rights reserved. Crucial Technology is a trademark of Micron Technology, Inc. and Micron is a registered trademark of Micron Technology, Inc. Memory products with Micron logo are the property of Micron Semiconductor Products, Inc.

Manufacturer-Quality Memory

We support more than 5,000 systems including desktops, laptops, servers, and printers

	128MB Upgrades	64MB Upgrades	32MB Upgrades		128MB Upgrades	64MB Upgrades	32MB Upgrades
Gateway				Micron Electronics			
4DX2-50V, 4DX2-66V	N/A	\$159.98	\$79.98	Client Pro MTA P133, P166, P200	\$219.98	\$109.98	\$59.98
E-3000 Series 200, 233	\$241.98	\$119.98	\$59.99	Client Pro P100, P120, P133, P150, P166, P200	\$219.98	\$109.98	\$59.98
E-3100 Series	\$241.98	\$119.98	\$59.99	Millennia LXA P100, P120, P133, P150, P166, P200	\$219.98	\$109.98	\$59.98
Family PC P5-133, -150, -166	\$219.98	\$109.98	\$59.98	Millennia MME P166, P200, P233	\$241.98	\$119.98	\$59.99
G5-166, -200	N/A	\$139.98	\$69.99	Millennia MXE, LXE P166, P166 Plus, P200, P200 Plus	\$219.98	\$109.98	\$59.98
G6-150, G6-200	\$219.98	\$109.98	\$59.98	Millennia P100, P120, P133, P150, P166, P200 and Plus Series	\$219.98	\$109.98	\$59.98
G6-233 Best Buy and G6-233 Home Essentials	\$241.98	\$119.98	\$59.99	Millennia Pro 200	\$219.98	\$109.98	\$59.98
G6-266, G6-233	\$241.98	\$119.98	\$59.99	Pro2 180, 200 (RevA & RevB)	\$279.98	\$139.99	\$79.99
G6-300XL	\$241.98	\$119.98	\$59.99	Millennia Transport P120, P133, P150	N/A	N/A	\$99.98
G6-333, G6-300	\$241.98	\$119.98	\$59.99	Millennia Transport XKE P233(A), 233(B)	N/A	\$199.98	\$99.99
GP6-300, GP6-300-2	\$241.98	\$119.98	\$59.99	Millennia Transport XPE P133, P150, P166	N/A	\$199.98	\$99.99
P5-120, P5-120 XL, P5-133, P5-133 XL	\$219.98	\$109.98	\$59.98	Millennia XKU 233, 266, 300, 333	\$241.98	\$119.98	\$59.99
P5-150, P5-150 XL, P5-166, P5-166 XL	\$219.98	\$109.98	\$59.98	Millennia XRU 233, 233 Plus, 266, 266 Plus	\$219.98	\$109.98	\$59.98
P5-200 XL	N/A	\$139.98	\$69.99	Vetix EL 1000, 1000N, 2000, 2000N	\$279.98	\$139.99	\$79.99
P5-60, P5-66, P5-75, P5-90	\$219.98	\$109.98	\$59.98	Vetix LXI, LXI-N, 2LXI, 2LXI-N	\$279.98	\$159.98	\$99.98
P5-90 XL, P5-100 XL	\$219.98	\$109.98	\$59.98				
Professional PC G6-200, G6-200 XL	\$219.98	\$109.98	\$59.98				
	128MB Upgrades	64MB Upgrades	32MB Upgrades		128MB Upgrades	64MB Upgrades	32MB Upgrades
HP				IBM			
Kayak XA PC Workstation	\$241.98	\$119.98	\$59.99	Aptiva (2137, 2136) E24, E26 and E46	\$241.98	\$119.98	\$59.99
LaserJet 4000, 5000, 8000 Series	N/A	\$179.98	\$89.99	Aptiva (2140) L31, L5H, L61, L71	\$241.98	\$119.98	\$59.99
LaserJet 5P	N/A	N/A	\$59.98	Aptiva (2159), Model S7H, S64, S66, S74, S78	\$219.98	\$119.98	\$59.98
Pavilion 3100 Series	N/A	\$119.98	\$59.99	Aptiva (2162) S35, S3C, S9M, S8C, S9C, S9H	N/A	\$119.98	\$59.99
Pavilion 5030, 5040, 5120	\$219.98	\$109.98	\$59.98	Aptiva (2168), Model A40, A90, A92	\$219.98	\$109.98	\$59.98
Pavilion 7050, 7055, 7070, 7090	\$219.98	\$109.98	\$59.98	Aptiva (2168), Model M62, M61, M53, M71	\$219.98	\$109.98	\$59.98
Pavilion 7110Z, 7120, 7125	\$219.98	\$109.98	\$59.98	Aptiva (2176), Model C55, C65, C66, C67, C73, C77	\$219.98	\$109.98	\$59.98
Pavilion 7270, 7280P	\$219.98	\$109.98	\$59.98	PC 300 Series Pentium Systems (6x7x-, 6585-)	\$219.98	\$109.98	\$59.98
Pavilion 8160, 8140, 8130	\$219.98	\$109.98	\$59.98	PC 300GL Series Pentium II Systems (6561)	\$241.98	\$119.98	\$59.99
Pavilion 8180, 8175, 8176	\$219.98	\$109.98	\$59.98	PC 300GL Series Pentium Systems (6272)	\$219.98	\$109.98	\$59.98
Pavilion 8190, 8240, 8246, 8280, 8275, 8260	\$241.98	\$119.98	\$59.99	PC 300XL Series Pentium Systems	\$239.98	\$119.98	\$59.99
Pavilion 8290	\$299.98	\$139.98	\$69.99	PC Server 320	\$263.98	\$131.98	\$79.98
Vectra VL 5/xx Series 3 PC	\$219.98	\$109.98	\$59.98	PC Server 330 PENTIUMII	\$279.98	\$139.99	\$79.99
Vectra VL 5/xxx MT Series 4 PC	\$219.98	\$109.98	\$59.98	ThinkPad 310ED	N/A	\$219.99	\$99.99
Vectra VL 5/xxx Series 4 PC	\$219.98	\$109.98	\$59.98	ThinkPad 365X, 365XD	N/A	N/A	\$99.99
				ThinkPad 380, 385	N/A	N/A	\$99.99
				ThinkPad 560	N/A	\$219.99	\$99.99
	128MB Upgrades	64MB Upgrades	32MB Upgrades				
Apple							
iMac	\$399.98	\$199.99	\$99.99				
Mac LC III	N/A	\$109.98	\$54.99				
Performa 5400, 6360, 6400	N/A	\$159.98	\$79.99				
Performa 6110CD, 6112CD, 6115CD	N/A	\$109.98	\$59.98				
Performa 6116CD, 6117CD, 6118CD	N/A	\$109.98	\$59.98				
Performa 6200, 6300	N/A	\$109.98	\$59.98				
Power Mac 5200/75 LC, 5260, 5300	N/A	\$109.98	\$54.99				
Power Mac 5500 Series	\$249.98	\$124.99	\$79.99				
Power Mac 6100 Series	N/A	\$109.98	\$59.98				
Power Mac 7100, 8100 Series	\$219.98	\$109.98	\$59.98				
Power Mac 7200/75/90	\$319.98	\$159.98	\$79.99				
Power Mac 7500, 7600, 8500	\$319.98	\$159.98	\$79.99				
Power Mac 9500 Series	\$319.98	\$159.98	\$79.99				
Power Mac G3 Series(M6141LL/A, M6202LL/A)Gossimer	\$241.98	\$119.98	\$59.99				
Power Mac G3 Series(M6142LL/A)Gossimer	\$241.98	\$119.98	\$59.99				

Call for our full line of printer, server, desktop and laptop memory.

These prices were current as of 10/12/98. They can (and do) change daily, so call now to check for our most current prices. Individual prices may vary according to your specific system and memory type.

Guaranteed Compatibility

Free Technical Support

30-day Money-back Guarantee

Volume Discounts

Same-Day Shipping

Limited Lifetime Warranty

Choose 203 at www.pcmag.com/infolink

crucialTM
TECHNOLOGY
A Division of Micron®

Your Factory-Direct Memory Source

MidWest Micro Business Solutions WKP-450, WKP-350

WKP-450: Pentium II/450, 13.8GB disk, 17-inch monitor, SDRAM; High-End Winstone: 22.3. \$3,249 direct. **WKP-350:** Pentium II/350, 8.0GB disk, 17-inch monitor, SDRAM; Business Winstone: 16.3. \$1,799 direct. Fletcher, OH; 800-728-8582, 937-368-2309; www.mwmicro.com; 527 at www.pcmag.com/infolink.

• Though the MidWest Micro Business Solutions WKP-450—Midwest Micro's high-end business system—is inappropriate for large

corporate installations, the company's mainstream machine, the MidWest Micro Business Solutions WKP-350, is a respectable if average managed PC. Whereas the WKP-450 is a tall, conventional tower that's somewhat difficult to service, the WKP-350 is a tractable, tool-free mini-tower. Running Version 3.1 of Intel LANDesk Client Manager, these systems offer remote inventory, voltage monitoring, and temperature monitoring, but little else. These

machines performed poorly on our Disk WinMark and CD-ROM WinMark tests; most of their other scores were average.

MidWest Micro had a mix of average and above-average scores on our Service and Reliability Survey.—*CM*

NEC PowerMate 8100, PowerMate Enterprise 8000

8100: Pentium II/450, 13.8GB disk, 17-inch monitor, SDRAM; High-End Winstone: 24.1. \$3,458 direct. **8000:**

SUMMARY OF FEATURES

Corporate PCs

■ YES ■ NO

Products listed in review order

	NEC PowerMate 8100	NEC PowerMate Enterprise 8000	NexTrend NexStar-450MP	Polywell Poly 800B5	ProGen Polaris PII 450	ProGen Polaris PII 350	Quantex QP6/450 SB-S	Quantex QP6/350 SB-J
Category	High-end	Mainstream	High-end	High-end	High-end	Mainstream	High-end	Mainstream
Price of tested configuration	\$3,458 direct	\$2,073 direct	\$2,759 direct	\$2,525 direct	\$2,149 direct	\$1,349 direct	\$2,649 direct	\$1,699 direct
Processor	Pentium II/450	Pentium II/333	Pentium II/450	Pentium II/400	Pentium II/450	Pentium II/350	Pentium II/450	Pentium II/350
Installed/maximum SDRAM	128MB / 384MB	64MB / 384MB	128MB / 384MB	128MB / 1,024B	128MB / 384MB	64MB / 384MB	128MB / 384MB	64MB / 384MB
Installed L2 pipelined-burst cache	512K	512K	512K	512K	512K	512K	512K	512K
Motherboard manufacturer	Intel	Intel	Micro-Star	Giga-Byte	Asus	A-Trend	Biostar	Biostar
Chip set	Intel 440BX	Intel 440LX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX
BIOS version and/or date	Phoenix 4.0	Phoenix 4.0	Award 4.51PG	Award 4.51PG	Award 4.51	Award 4.51	AMI DMI 1.0B	AMI DMI 1.0B1
Hard disk	13.8GB IBM DTTA-371440	6.1GB IBM DHEA-36480	13.8GB IBM DTTA 371440	9.5GB Maxtor 91000D8	9.5GB Maxtor 91000D8	9.5GB Maxtor 91000D8	13.8GB IBM DTTA 371440	8.0GB IBM DHEA-38451
Graphics and Multimedia								
Graphics adapter	ATI Xpert@Work AGP (8MB SGRAM)	ATI Xpert@Work AGP (4MB SGRAM)	Matrox Millenni- um II AGP (8MB WRAM)	3Dlabs Permedia 2 AGP (8MB SGRAM)	Matrox Millenni- um G200 AGP (8MB SGRAM)	Matrox Millenni- um G200 AGP (8MB SGRAM)	Number Nine Revolution IV AGP (16MB SDRAM)	Diamond Fire GL Pro 1000 AGP (8MB SGRAM)
Graphics chip set	ATI 3D Rage Pro Turbo AGP 2X	ATI 3D Rage Pro Turbo AGP 2X	Matrox MGA-2164W	3Dlabs Permedia 2	Matrox MGA-G200	Matrox MGA-G200	Number Nine T2R4 Silver Hammer	3Dlabs Permedia 2
Monitor	NEC C700	NEC C700	CTX VL950	Sampo KM-810	CyberVision C92	ProGen P-715	Quantex AT1097P	Quantex XP175N
Claimed/measured diagonal size, in inches	17 / 16.0	17 / 16.0	19 / 18.0	19 / 17.5	19 / 17.5	17 / 16.0	19 / 17.5	19 / 17.5
CD-ROM drive	32X Lite-On LN-301	32X NEC CDR- 1900A	36X AOpen A936E	36X Artec ACD-361	32X Sony CDU-701	32X Sony CDU-701	4.8X DVD Toshiba SDM-1202	32X Toshiba XM-6202B
Sound device (interface)	Crystal CS4235D (ISA)	Integrated Yamaha OPL3-Sax (ISA)	Creative Labs Sound Blaster AWE64 (ISA)	Creative Labs Ensoniq AudioPCI (PCI)	Aureal AU8820 (PCI)	Aureal AU8820 (PCI)	ESS Technology ES1869 (ISA)	ESS Technology ES1869 (ISA)
Audio synthesis	Wavetable	FM	Wavetable	Wavetable	Wavetable	Wavetable	FM	FM
Networking and Manageability								
DMI browser	Intel LANDesk Client Manager 3.21	Intel LANDesk Client Manager 3.21	Intel LANDesk Client Manager 3.12	Intel LANDesk Client Manager 3.0	Intel LANDesk Client Manager 3.12	Intel LANDesk Client Manager 3.12	Intel LANDesk Client Manager 3.30	Intel LANDesk Client Manager 3.3
LAN wake-up/Remote power-on/power-off	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
Remote BIOS update/component locking	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
10/100 Mbps network adapter (interface)	Integrated 3Com Fast Etherlink XL (PCI)	Integrated Intel Ether Express Pro (PCI)	Intel Ether Express Pro (PCI)	NetGear FA310TX (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast EtherLink XL (PCI)	Intel Ether Express Pro (PCI)	Intel Ether Express Pro (PCI)
Expandability								
Expansion-bus slots	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 1 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP
Front-accessible drive bays (5.25 / 3.5)	3 / 1	2 / 1	6 / 2	3 / 2	3 / 2	3 / 2	4 / 1	4 / 1
Internal drive bays (5.25 / 3.5)	0 / 2	0 / 1	0 / 2	0 / 2	0 / 2	0 / 2	0 / 4	0 / 4
Parallel/serial/USB ports	1 / 2 / 2	1 / 2 / 1	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2
Power-supply wattage	200	200	300	300	235	235	200	200
Service and Support								
24-hour, 7-day technical support	■	■	■	■	■	■	■	■
Standard warranty on parts/labor	3 years/3 years	3 years/3 years	3 years/3 years	3 years/5 years	3 years/1 year	3 years/1 year	3 years/1 year	3 years/1 year
On-site service charge for 1 year	Included	Included	Included	\$75	Included	Included	Included	Included
24-hour turnaround for parts replacement	■	■	■	■	■	■	■	■

Pentium II/333, 6.1GB disk, 17-inch monitor, SDRAM; Business Winstone: 16.9. \$2,073 direct. Mountain View, CA; 888-863-2669, 978-264-8000; www.nec.com; 528 at www.pcmag.com/infolink.

• NEC's PowerMate series, while not up to par with the Compaq and HP PCs, is suitable for large corporate customers. The slimline 8000 and midtower 8100 share a common design philosophy, from tool-free chassis to robust desktop management support. Both units im-

plement many management features, including chassis intrusion and CPU temperature detection, remote restart and shutdown, and Wake-on-LAN.

Each unit features an AGP slot that resides on the main board and uses a new type of card connector that, while good for future upgrades, limits your current graphics card options: Older cards and even some current models (Matrox's G200-based boards, for example)

do not fit in the new slot configuration. The 440LX-based 8000's compact footprint does not allow much room for expansion, but thanks to integrated Ethernet and audio, all of its expansion slots are unoccupied. The 8100's large backplane is also unoccupied, but similarly sized chassis from other vendors generally provide up to two extra drive bays. NEC offers a good warranty, and both systems were strong performers on our benchmark tests.—JAH

See www.pcmag.com for interactive views

Continues

Reason Square 1 BX/A	Reason Square 6 BX/JN	Royal Power Desktop	SAG STA Dual Power System 400	SAG STA Dual Power System 300	Sys Performance Pro 450	Sys Performance Pro 400BA	Tagram Platinum T5700	Tagram Platinum T5300	Tangent Medallion BX 400
High-end \$2,295 direct Pentium II/450 128MB / 384MB 512K A-Trend Intel 440BX Award 4.51PG 9.6GB IBM DTTA-371010	Mainstream \$1,395 direct Pentium II/350 64MB / 384MB 512K Intel Intel 440BX Phoenix 4.0 4.8GB Quantum Fireball EL	High-end \$2,198 direct Pentium II/400 128MB / 256MB 512K Intel Intel 440BX Phoenix 4.0 8.0GB Maxtor 90840D6	High-end \$2,548 direct Pentium II/400 128MB / 256MB 512K Supermicro Intel 440BX AMI DMI 2.0 8.6GB Seagate ST39140A	Mainstream \$1,561 direct Pentium II/300 64MB / 512MB 512K Intel Intel 440BX Phoenix 4.0 6.2GB Seagate ST36530A	High-end \$2,149 direct Pentium II/450 128MB / 1,024B 512K Giga-Byte Intel 440BX Award 4.51PGM 9.6GB IBM DTTA-371010	Mainstream \$1,849 direct Pentium II/400 64MB / 1,024MB 512K Giga-Byte Intel 440BX Award 4.51PGM 9.6GB IBM DTTA-371010	High-end \$1,899 direct Pentium II/450 128MB / 384MB 512K Giga-Byte Intel 440BX Award 4.51PG 9.6GB IBM DTTA-371010	Mainstream \$1,249 direct Pentium II/266 64MB / 384MB 512K GVC Intel 440LX AMI DMI 2.0 9.6GB IBM DTTA-371010	High-end \$3,195 direct Pentium II/400 128MB / 384MB 512K Supermicro Intel 440BX AMI DMI 2.5 9.6GB IBM DTTA-371010
Matrox Millennium G200 AGP (8MB SGRAM) Matrox MGA-G200 Princeton EO710 17 / 16.0 32X TEAC CD-532E Yamaha DS-XG (PCI) Wavetable	Motherboard AGP (4MB SGRAM) ATI 3D Rage Pro Turbo AGP 2X Princeton EO710 17 / 16.0 32X Toshiba XM-6202B Integrated Crystal CS4235 (ISA) Wavetable	Matrox Millennium G200 AGP (8MB SGRAM) Matrox MGA-G200 CyberVision C92 19 / 17.5 32X Toshiba XM-6202B Integrated Crystal CS4611 (PCI) Wavetable	Matrox Millennium G200 AGP (8MB SGRAM) Matrox MGA-G200 Hitachi CM630U 17 / 15.9 32X Sony CDU-711 Ensoniq S5016 (PCI) Wavetable	Real 3D Starfighter AGP (8MB SGRAM) Intel i740 CTX VL700 17 / 15.7 32X Sony CDU-711 Integrated Crystal CS4611 (PCI) Wavetable	Matrox Millennium G200 AGP (8MB SGRAM) Matrox MGA-G200 SYS SPM-17-MS 17 / 15.7 32X Toshiba XM-6202B Creative Labs Sound Blaster AWE64 (ISA) Wavetable	Matrox Millennium G200 AGP (8MB SGRAM) Matrox MGA-G200 SYS SPM-17-MS 17 / 15.7 32X Toshiba XM-6202B Creative Labs Sound Blaster AWE64 (ISA) Wavetable	Matrox Millennium G200 AGP (8MB SGRAM) Matrox MGA-G200 MAG 720 V2 17 / 16.0 32X Toshiba XM-6202B S3 SonicVibes (PCI) Wavetable	Matrox Millennium G200 AGP (8MB SGRAM) Matrox MGA-G200 MAG DJ 530 15 / 14.0 32X Toshiba XM-6202B S3 SonicVibes (PCI) Wavetable	STB Velocity 128 AGP (4MB SGRAM) nVidia RIVA 128 ViewSonic VPA 150 15 / 15.0 32X Toshiba XM-6202B Aztech Labs SC128-3D (PCI) FM
Intel LANDesk Client Manager 3.1 Intel Ether Express Pro (PCI)	Intel LANDesk Client Manager 3.1 Integrated Intel Ether Express Pro (PCI)	Intel LANDesk Client Manager 3.3 Intel Ether Express Pro (PCI)	Intel LANDesk Client Manager 3.1 3Com Fast Etherlink XL (PCI)	Intel LANDesk Client Manager 3.1 3Com Fast Etherlink XL (PCI)	Intel LANDesk Client Manager 3.11 3Com Fast Etherlink XL (PCI)	Intel LANDesk Client Manager 3.11 3Com Fast Etherlink XL (PCI)	Intel LANDesk Client Manager 3.11.1 3Com Fast Ethernet XL (PCI)	Intel LANDesk Client Manager 3.11.1 3Com Fast EtherLink XL (PCI)	Intel LANDesk Client Manager 3.3 Intel Ether Express Pro (PCI)
2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP 3 / 1 0 / 1 1 / 2 / 2 250	1 ISA, 1 PCI, 1 PCI/ISA, 1 AGP 1 / 2 0 / 1 1 / 2 / 1 235	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP 3 / 2 0 / 1 1 / 2 / 2 250	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP 3 / 2 0 / 2 1 / 2 / 2 235	1 ISA, 3 PCI, 1 PCI/ISA, 1 AGP 3 / 2 0 / 2 1 / 2 / 2 235	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP 3 / 2 0 / 3 1 / 2 / 2 235	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP 3 / 3 0 / 3 1 / 2 / 2 235	2 ISA, 4 PCI, 1 PCI/ISA, 1 AGP 4 / 2 0 / 1 1 / 2 / 2 250	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP 4 / 3 0 / 0 1 / 2 / 2 250	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP 2 / 3 0 / 3 1 / 2 / 2 230
6 years/6 years \$49 (free if local)	6 years/6 years \$49 (free if local)	1 year/1 year \$144.95 (2 years)	3 years/3 years Included	3 years/3 years \$30	1-6 years/5 years Included	1-6 years/5 years Included	3 years/1 year \$45	3 years/1 year \$45	1-3 years/3 years Included



With the new printers
installed, the IS Manager notices
a slight shift in status.

Introducing the HP LaserJet 8100, our newest monochrome printer. Along with HP reliability, this departmental printer offers a number of ways to control how and when documents are printed. It lets you make additional printouts right from the printer control panel, allows for private printing of confidential documents, and does all of this at up to a 32 ppm print speed. Visit www.hp.com/go/newprinters to learn more about our hassle-free network printers.



NexTrend NexStar-450MP

Pentium II/450, 13.8GB disk, 19-inch monitor, SDRAM; High-End Winstone: 28.2. \$2,759 direct. Fremont, CA; 877-833-8833, 510-659-8500; www.nexttrendpc.com; 531 at www.pcmag.com/infolink.

• A robust LANdesk implementation, top-notch performance, and helpful attention to detail characterize NexTrend's high-end corporate entry, but just try to find room for its tall tower case. The unit was able to read asset data. It has hardware monitoring and

supports Wake on LAN but does not have a chassis intrusion switch. —JAH

Polywell Poly 800B5

Pentium II/400, 9.5GB disk, 19-inch monitor, SDRAM; High-End Winstone: 24. \$2,525 direct. South San Francisco, CA; 800-999-1278, 650-583-7222; www.polywell.com; 532 at www.pcmag.com/infolink.

• The Polywell Poly 800B5 is a midrange performer with some useful perks. But while we saw hardware monitoring of data locally, we were unable to access data remotely. Corpo-

rate buyers are unlikely to be impressed by the three-way speakers and Diamond FireGL graphics card; the unit is better suited to home and SOHO users. —JAH

ProGen Polaris PII 450, Polaris PII 350

Polaris PII 450: Pentium II/450, 9.5GB disk, 19-inch monitor, SDRAM; High-End Winstone: 24.4. \$2,149 direct. **Polaris PII 350:** Pentium II/350, 9.5GB disk, 17-inch monitor, SDRAM; Business Winstone: 17.6. \$1,349 direct. Tustin, CA; 800-848-1353, 714-566-9200; www.progen.com; 534 at www.pcmag.com/infolink.

SUMMARY OF FEATURES

Corporate PCs

■ YES ■ NO

Products listed in review order

	Tangent Medallion BX 300	Toshiba Equium 7100D	Toshiba Equium 7000S	Total Peripherals Serengeti-BX350	Unicent Avanta L300	XL 400 MTower SP
Category	Mainstream	High-end	Mainstream	Mainstream	Mainstream	High-end
Price of tested configuration	\$1,495 direct	\$2,630 street	\$1,670 street	\$1,720 street	\$1,249 direct	\$2,049 direct
Processor	Pentium II/333	Pentium II/400	Pentium II/333	Pentium II/350	Pentium II/300	Pentium II/400
Installed/maximum SDRAM	64MB / 384MB	128MB / 256MB	64MB / 128MB	64MB / 768MB	64MB / 384MB	128MB / 384MB
Installed L2 pipelined-burst cache	512K	512K	512K	512K	512K	512K
Motherboard manufacturer	Supermicro	Toshiba	Toshiba	ECS	Micro-Star	Supermicro
Chip set	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440LX	Intel 440BX
BIOS version and/or date	AMI DMI 2.5	Phoenix 4.0	Phoenix 4.0	Award 4.51PG	AMI DMI 1.4	AMI DMI 2.5
Hard disk	6.1GB Fujitsu MPB-3064ATU	6.1GB Western Digital Caviar AC36400	4.1GB Western Digital Caviar AC24300	4.1GB Quantum Fireball SE 4.3A	6.1GB Quantum Fireball ST	8.0GB Maxtor 9084006
Graphics and Multimedia						
Graphics adapter	ATI Xpert@Work AGP (4MB SGRAM)	Motherboard AGP (6MB SGRAM)	Motherboard AGP (6MB SGRAM)	EONtronic DA011 AGP (8MB SDRAM)	Matrox Productiva AGP (8MB SDRAM)	Matrox Millennium G200 AGP (8MB SGRAM)
Graphics chip set	ATI 3D Rage Pro Turbo AGP 2X	ATI 3D Rage Pro Turbo AGP 2X	ATI 3D Rage Pro Turbo AGP 2X	Intel i740	Matrox MGA-G100	Matrox MGA-G200
Monitor	CTX 1792E	Toshiba TekBright 700P	Toshiba TekBright 700P	Opus 778 L	CyberVision C50	OptiQuest VCDTS 21369
Claimed/measured diagonal size, in inches	17 / 15.9	17 / 16.0	17 / 16.0	17 / 15.8	15 / 13.5	17 / 15.8
CD-ROM drive	32X Toshiba XM-6202B	32X Toshiba XM-6202B	32X Toshiba XM-6202B	32X Toshiba XM-6202B	32X Toshiba XM-6202B	32X TEAC CD-532E
Sound device (interface)	Aztech Labs SC128-3D (PCI)	Integrated Crystal CS4236 (PCI)	Integrated Crystal CS4236 (PCI)	Creative Labs Sound Blaster AWE64 (ISA)	Creative Labs EnsoniqPCI Audio (PCI)	Creative Labs EnsoniqPCI Audio (PCI)
Audio synthesis	Wavetable	Wavetable	Wavetable	Wavetable	Wavetable	Wavetable
Networking and Manageability						
DMI browser	Intel LANdesk Client Manager 3.0	Intel LANdesk Client Manager 3.2	Intel LANdesk Client Manager 3.2	Intel LANdesk Client Manager 3.1	Intel LANdesk Client Manager 3.1	Intel LANdesk Client Manager 3.3
LAN wake-up/Remote power-on/powe-off	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■
Remote BIOS update/component locking	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
10/100-Mbps network adapter (interface)	Intel Ether Express Pro (PCI)	Integrated Intel Ether Express Pro (PCI)	Integrated Intel Ether Express Pro (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)
Expandability						
Expansion-bus slots	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	0 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	0 ISA, 1 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 4 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP
Front-accessible drive bays (5.25" / 3.5")	2 / 3	2 / 1	1 / 1	3 / 2	2 / 3	3 / 2
Internal drive bays (5.25" / 3.5")	0 / 3	0 / 2	0 / 1	0 / 1	0 / 3	0 / 2
Parallel/serial/USB ports	1 / 2 / 2	1 / 1 / 2	1 / 1 / 2	1 / 2 / 2	1 / 2 / 2	1 / 2 / 2
Power-supply wattage	230	200	145	235	250	300
Service and Support						
24-hour, 7-day technical support	■	■	■	■	■	■
Standard warranty on parts/labor	1-3 years/3 years	3 years/1 year	3 years/1 year	3 years/1 year	3 years/1 year	3 years/3 years
On-site service charge for 1 year	Included	Included	Included	\$79	Included	Included
24-hour turnaround for parts replacement	■	■	■	■	■	■



FOCUS ON YOUR CUSTOMER

Customer-focused, customer-driven. Over the past decade, the giants of Corporate America have made the customer their strategic centerpiece, investing huge sums in information technology to help them improve their customer relationships.

And, what they've been saying is, 'We have to start treating our customers like small businesses do...with the same personal attention to their needs and the same ability to customize a product or a service.'

While big businesses are using technology to play catch up with companies with one, five, ten, or 20 employees, small businesses all over the world are finding out they can use those same solutions to build their advantage.

SYMANTEC.TM

Software solutions can help small businesses serve their customers better than ever, while at the same time helping them improve their own productivity. There are software solutions that not only put the power of information technology at their fingertips, but also protect customers from the problems that systems can cause.

Symantec has spent nearly two decades providing such solutions to individuals, businesses and other institutions around the world, making them more productive and keeping their computers safe and reliable — anywhere, anytime.

"With such revolutionary developments as corporate downsizing, computing and the Internet, the number of small businesses around

you more touch and feel when it comes to your customers?

Understanding

Customer-driven means that a business offers its customers products and services they really need, rather than presenting "a product in search of a market." The price is right; the packaging and shipping is the way they want it; their operation is 24 hours a day, so your support is too. The best businesses are the ones that understand their customers well enough not only to see all this, but also to see what's coming around the bend.

It's never been an easy task. You need to know your customer base by market or geographic segment, but that's not enough. You need to

tools can help you maintain the professionalism and personal touch you've been known for, reminding you and your staff about important customer dates and events.

Responsiveness

Responsiveness on a day-to-day basis says you provide customers with the answers they need when they need them. So sales and service people — no matter where they are — must have instant, easy access to customer databases and the ability to transmit quotes, presentations, and even training programs to customer sites. Access can also be speeded by technology that, for instance, enables caller ID to bring up the record before the sales or service person says "good morning."

It doesn't matter what information your customer needs and how fast, there's a communication vehicle for getting it there and you have to use it all: e-mail, voice mail, fax, overnight delivery. For instance, computer-to-fax is the fastest way to get your customers hard copy. We're talking about hard copy you send from your computer that might contain a just-assembled combination of the latest promotions and product illustrations.

Further, your customers should be able to access your systems to obtain the same information via e-mail or "fax on demand."

Voice mail? It's your image, they say, and technology exists for any size company to make sure you sound right, respond quickly, and keep a record of calls and faxes.

Productivity

Being able to provide your customers with better products and ever higher levels of service, being

Be understanding, responsive, productive and protective. This is what being customer-driven is all about.

the world has exploded," says Symantec's Dana Siebert, VP, Americas. "This is great because small businesses have always been a major source of innovation and service. A primary goal for companies like ours has to be to help level the playing field for them and contribute to their growth.

"What we're saying here is they have an advantage — their understanding of and responsiveness to their customers — and we think we can help them keep it."

The Touch and Feel of Technology

What does it mean to be customer-focused and customer-driven? How can technology give

know your customers individually and they need to feel that you do — that you know their business, you know them as people.

For instance, to create winning proposals over and over again, you want your customer's plans and the history of your relationship at your fingertips. We're not only talking volume, credit history, and the bottom line, but also the nuances of how you have worked together.

Technologically, both the top-down planning and the individual interaction require a customer database: an information file on your customers and their accounts — the notes, the phone discussion logs, the presentations and proposals.

As your company grows, software

FOR MORE INFORMATION VISIT US ON THE WEB AT

able to develop and retain close relationships with individual customers as your customer base grows — all this carries a cost to your business. You can't stay customer-driven as we've described if your resources are strained and your bottom line suffers.

The technology solutions we've noted above — the customer and prospect database, word processor, e-mail messaging and other communications tools such as computer-to-fax and the calendar — are also crucial productivity tools for your organization, allowing them to be responsive to customers literally at the push of a button.

To improve ease-of-use, while safeguarding your investment in new and older computing equipment, such tools must operate on all major computing platforms.

These tools are win-win solutions for the front lines of your business — the people who plan and deliver what the customer needs. You also need technology that protects your business and your customer's, and solutions exist for your back office to provide these safeguards.

Protection

Flash...computers are vulnerable and fallible. They crash, wiping out that 10-page proposal you hadn't saved. They can get viruses. Installing new programs can mess up your system. Worse, you can wipe out data on your customer. And, electronically connected to your customers, you can send them a virus that wreaks havoc on their systems.

The good news is that technology solutions exist to fend off these problems.

Small Business Solutions



ACT!™ keeps contacts, relationships and results. This customer and calendar management software provides instant access to critical information about your customers and appointments and triggers on-screen alerts to remind you of important dates. ACT! supports Internet and e-mail access and lets you share information with your team.



WinFax PRO™ gives you hassle-free faxing right from your computer, allowing you to send professional-quality faxes, including material from your ACT! databases, to one or more customers. You can also economize by scheduling faxes for offpeak hours. **WinFax Pro**™ faxing enables **WinFax Pro** to share its modem and phone lines with other **WinFax PRO** copies on the network.



TalkWorks PRO™ means a more professional image for small businesses with up to five employees. This sales and fax communications software provides fax reminders, enabling your customers to dial your company and listen to lists of promotions, price sheets, and other information. Away from your office? **TalkWorks PRO** can call you with messages to collect numbers. Other features include multiple mailboxes and call management, tracking all calls and faxes.



pcANYWHERE™ lets you keep building customer relationships no matter where you are. From your field office in Detroit, you can carry on electronic sessions with your customers in New York, sending them training programs or presentations from your laptop or the corporate computer in Chicago. Naturally, **pcANYWHERE** lets you access customer data at the home office. Many security features are built in.



Norton AntiVirus™ eliminates today's and tomorrow's viruses. **Norton AntiVirus** is the best protection for you and any customers you are connected to electronically. **PC Magazine**, in giving this product the Editor's Choice award this year, called it "the best combination of virus protection, performance, and usability." **Forbes** Laboratories confirms that it provides 100% detection of "in the wild" viruses from any source, such as the Internet, floppy disks, and shared files.



Norton Utilities™ provides unrivaled problem-solving power and control by detecting, repairing, and interrupting most computer problems. A trusted solution for more than 18 years, **Norton Utilities** continuously monitors your system so you don't have to guess which utility to launch when there's a problem. Worried about crashes and disaster-recovery downtime? As **PC Magazine** has stated, **Norton Utilities** is "the industry leader" in protecting against crashes—doing things as effective as competitors—and provides advanced disaster-recovery capabilities.

SYMANTEC SMALL BUSINESS SOFTWARE.



As a small business owner, you know that keeping your customer in focus is critical to your success. That's why you need Symantec Small Business Software. You see, we've developed an entire line of products to help you be more productive and stay well protected. And that means more time to build a customer centered business with the least amount of PC downtime. Which is exactly the way it should be.



FREE 30-DAY TRIAL CD! TO ORDER CALL 1-800-678-4333 EXT. 93332

SYMANTEC.

TM

Norton Utilities, Norton AntiVirus, ACT!, and WinFax are registered trademarks of Symantec Corporation. TalkWorks PRO and pcANYWHERE 2.0 are trademarks of Symantec Corporation. All other brand names and trademarks are the property of their respective owners. © 1998 Symantec Corporation. All Rights Reserved.

• With these two business offerings from Pro-Gen Systems—though they're well built and inexpensive—managed PC is a misnomer. They are difficult to service, and their remote-management packages are not as extensive as they could be. These systems would fit well into a small office network.

Neither PC offers a chassis intrusion alarm or such advanced management features as Alert on LAN, but their LANDesk implementations monitor temperature, voltage, and fan

speed. Uniquely, an audio alarm from an internal speaker sounds when temperature, voltage, or fan problems occur. The system inventory, however, is minimal.—CM



Quantex QP6/450 SB-5, QP6/350 SB-3

QP6/450 SB-5: Pentium II/450, 13.8GB disk, 19-inch monitor, SDRAM; High-End Winstone 99: No score. \$2,649 direct. **QP6/350 SB-3:** Pentium II/350, 8GB disk, 19-inch monitor, SDRAM; Business Winstone 99: 17.3. \$1,699 direct. Somerset, NJ; 800-346-6685, 732-563-4166; www.quantex.com; 535 at www.pcmag.com/infolink.

• These Quantex systems don't have top-level manageability and serviceability, but they are reasonable choices for a small to medium-size network. Quantex offers extra support levels for corporate customers; it received a mix of average and above-average scores on our Service and Reliability Survey.

The Quantex QP6/350 SB-3's Intel LANDesk Client Manager 3.3 was able to report asset information and monitor hardware locally; however, the test server reported that it couldn't awaken the system (which was up and running). The Quantex QP6/450 SB-5 was seen by the server in informal testing and could report system information both locally and remotely. Neither system monitors fan speed or chassis intrusion. Both come in easily accessed tool-free tower cases.—BB

Reason Square 1 BX/A, 6 BX/JN

Square 1 BX/A: Pentium II/450, 9.6GB disk, 17-inch monitor, SDRAM; High-End Winstone 99: 24.4. \$2,295 direct. **Square 6 BX/JN:** Pentium II/350, 4.8GB disk, 17-inch monitor, SDRAM; Business Winstone 99: 16.1. \$1,395 direct. Minneapolis; 800-800-4860, 612-717-3600; www.reason-computer.com; 537 at www.pcmag.com/infolink.

• Offering mixed manageability features, the two Reason systems are not true corporate PCs. The Reason Square 6 BX/JN has a lockable, tool-free desktop case and a chassis intrusion detector, but no alerts were sent when the case was opened. Both units can reboot and shut down remotely and can provide standard asset information, but the 6 BX/JN did not report fan speed and tempera-

ture data. The Reason Square 1 BX/A's non-lockable midtower case lacks an intrusion detector.

Both units were mostly average performers, but the 6 BX/JN's score on our 2-D graphics tests was far below average. Reason offers a three-year-parts, six-year-labor warranty. Lifetime toll-free technical support is available during business hours, six days a week.—RSA

Royal Power Desktop

Pentium II/400, 8.0GB disk, 19-inch monitor, SDRAM; High-End Winstone 99: 26.1. \$2,198 direct. City of Industry, CA; 800-486-0008, 626-855-5077; www.goroyalpc.com; 538 at www.pcmag.com/infolink.

• The Royal PC offers good performance but lags in remote-management features. It has a short, one-year warranty with six-day, business-hour technical support. Its nonlockable midtower case lacks a chassis intrusion detector. Using Intel LANDesk Client Manager 3.3, we could monitor the unit's health and assets locally but not remotely.—RSA

SAG STA Dual Power System 400, 300

400: Pentium II/400, 8.6GB disk, 17-inch monitor, SDRAM; High-End Winstone: No score. \$2,548 direct. **300:** Pentium II/300, 6.2GB disk, 17-inch monitor, SDRAM; Business Winstone: 15.2. \$1,561 direct. North Andover, MA; 800-989-3475, 978-683-0339; www.sagelec.com; 539 at www.pcmag.com/infolink.

• Like many of the systems in this roundup, the two SAG PCs stretch the definition of managed PC. They performed relatively well, but their chassis designs are not conducive to quick repair, and their LANDesk implementations are, on the whole, mediocre. While both systems provide fan, temperature, and voltage monitoring, they lack chassis intrusion alarms and Alert on LAN technology.

The SAG STA Dual Power System 400 is more of a server or workstation than an office



PC: a tall tower offering four available drive bays and a slot for a second CPU. The SAG STA Dual Power System 300 offers an orderly and roomy interior but has one free IRQ and no free DIMM slots.—CM

Ends

Xi 400 MTower CSP Zenon Z-Corp

Mainstream	Mainstream
\$1,999 direct	\$950 direct
Pentium II/400	Pentium II/300
64MB / 384MB	64MB / 256MB
512K	512K
Supermicro	BCM
Intel 440BX	Intel 440EX
AMI DMI 2.5	Award 4.51PG
13.8GB IBM	8.6GB Seagate
DTTA-371440	Medalist Pro
	ST39140A
Matrox Millennium G200 AGP (8MB SGRAM)	Motherboard AGP (4MB SGRAM)
Matrox MGA-G200	ATI 3D Rage Pro Turbo AGP 2X
OptiQuest VCDTS 21369	CyberVision C50
17 / 15.8	15 / 13.5
32X TEAC CD-532E	32X Samsung SCR-3231
Creative Labs Ensoniq PCI Audio (PCI)	Integrated ESS Technology ES1938 (PCI)
Wavetable	Wavetable
Intel LANDesk Client Manager 3.0	Intel LANDesk Client Manager 3.1
3Com Fast Etherlink XL (PCI)	3Com Fast Etherlink XL (PCI)
2 ISA, 3 PCI, 1 PCI/ISA, 1 AGP	1 ISA, 1 PCI, 1 PCI/ISA, 1 AGP
3 / 2	2 / 2
0 / 2	0 / 1
1 / 2 / 2	1 / 2 / 2
300	235
3 years/3 years Included	1 year/1 year \$99

**ATTENTION ALL YOU BLEARY-EYED
PORTABLE COMPUTERHOLICS.
CHECK OUT OUR EASY-TO-READ SCREEN.
(IF YOU STILL CAN.)**

**DELL® INSPIRON™ 7000 D300LT
PENTIUM® II PROCESSOR AT 300MHz**

All-in-One Multimedia Performance

- 15" XGA Active Matrix Display
- 128MB SDRAM (384MB Max*)
- *NEW* 8GB Ultra ATA Hard Drive
- Removable Combo 2X DVD-ROM Drive and 3.5" Floppy Drive
- 2X AGP 8MB ATI Rage Pro 3D Video
- 3D Surround Sound and Hardware Wavetable
- Intelligent Lithium Ion Battery
- Custom Leather Case
- Internal 56K Capable® V.90 Fax Modem
- Microsoft® Office 97 Small Business Edition v2.0
- Microsoft Windows® 98
- Touchpad

• 3-Year Limited Warranty†

★ *Second Intelligent Lithium Ion Battery, add \$129.*

★ *3Com® 10/100 Fast Ethernet Adapter, add \$129.*

\$3949

Business Lease*: \$150/Mo., 36 Mos.
Order Code #891131

**DELL INSPIRON 7000 D300LT
PENTIUM II PROCESSOR AT 300MHz**

All-in-One Multimedia Performance

- 15" XGA Active Matrix Display
- 64MB SDRAM (384MB Max*)
- 4GB Ultra ATA Hard Drive
- Removable Combo 24X Max^{AA} Variable CD-ROM and 3.5" Floppy Drive
- 2X AGP 4MB ATI Rage Pro 3D Video
- 3D Surround Sound and Hardware Wavetable
- Intelligent Lithium Ion Battery
- Internal 56K Capable® V.90 Fax Modem
- Microsoft Office 97 Small Business Edition v2.0
- Microsoft Windows 98
- Touchpad

• 3-Year Limited Warranty†

★ *Upgrade to 96MB SDRAM, add \$99.*

★ *Upgrade to a Removable Combo 2X DVD-ROM Drive and 3.5" Floppy Drive, add \$199.*

\$2999

Business Lease*: \$114/Mo., 36 Mos.
Order Code #891103

**DELL INSPIRON 7000 D266GT
PENTIUM II PROCESSOR AT 266MHz**

All-in-One Multimedia Performance

- 14.1" XGA Active Matrix Display
- 64MB SDRAM (384MB Max*)
- 4GB Ultra ATA Hard Drive
- Removable Combo 24X Max^{AA} Variable CD-ROM and 3.5" Floppy Drive
- 2X AGP 8MB ATI Rage Pro 3D Video
- 3D Surround Sound and Hardware Wavetable
- Intelligent Lithium Ion Battery
- Internal 56K Capable® V.90 Fax Modem
- Microsoft Office 97 Small Business Edition v2.0
- Microsoft Windows 98
- Touchpad

• 3-Year Limited Warranty†

★ *Upgrade to a 6.4GB Ultra ATA Hard Drive, add \$199.*

★ *Second Intelligent Lithium Ion Battery, add \$129.*

\$2799

Business Lease*: \$106/Mo., 36 Mos.
Order Code #891111



**NEW DELL INSPIRON 3500 D233XT
PENTIUM II PROCESSOR AT 233MHz**

Lightweight, Light Price Notebook

- 13.3" XGA Active Matrix Display
- 32MB SDRAM (256MB Max)
- 3.2GB Ultra ATA Hard Drive
- Modular 24X Max^{^^} Variable CD-ROM
- Modular 3.5" Floppy Drive
- NeoMagic MediaMagic 256AV AGP Video
- 3D Surround Sound and Software Wavetable
- Intelligent Lithium Ion Battery
- Microsoft Home Essentials 98 with Money 98
- Microsoft Windows 98
- Touchpad
- **3-Year Limited Warranty***

★ Upgrade to 48MB SDRAM, add \$49.

★ Upgrade to a 4GB Ultra ATA Hard Drive, add \$99.

★ 56K Capable[®] x2 Modem, add \$99.

★ 3Com 10/100 Fast Ethernet Adapter, add \$129.

\$1999

Business Lease[®]: \$76/Mo., 36 Mos.
Order Code #891113



For faster service, please have your order code and keycode available when calling.

Pricing not discountable. *Prices and specifications valid in U.S. only and subject to change without notice. **For a complete copy of Guarantees or Limited Warranties, write Dell USA L.P., Attn: Warranties, One Dell Way, Round Rock, TX 78682. **24X Max/10X Min. *Download speeds limited to 53Kbps. Upload speeds are less (in the 30Kbps range) and vary by modem manufacturer. Speeds also vary depending on line conditions. Analog phone line and compatible server equipment required. *Maximum RAM configurations require a factory installed 128MB SoDIMM, which must be installed at time of initial purchase. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation MS. Microsoft and Windows are registered trademarks of Microsoft Corporation. 3Com is a registered trademark of 3Com Corporation. ©1998 Dell Computer Corporation. All rights reserved.



pentium® II

If your portable is giving you eye fatigue, pick up the Dell[®] Inspiron[™] 7000 with a 15-inch display and up to 8MB of video RAM. It has a good-looking price, and is easier on the eyes than portables you've strained your eyes at before. Call or visit our website.

TO ORDER BY PHONE

Keycode #04926

800-590-7455

M-F 7a-9p • Sa 10a-6p • Su 12p-5p CT

In Canada: call 800-233-0702

In Mexico: call 001-800-210-7607

GSA Contract #GS-35F-4076D

BUILD YOUR OWN AND ORDER ONLINE

BE DIRECT™ DELL

www.dell.com/buydirect

Sys Performance Pro 450, 400BA

450: Pentium II/450, 9.6GB disk, 17-inch monitor, SDRAM; High-End Winstone: 28.9. \$2,149 direct. **400BA:** Pentium II/400, 9.6GB disk, 17-inch monitor, SDRAM; Business Winstone: 19.6. \$1,849 direct. Cyprus, CA; 800-613-9963; www.sys.com; 540 at www.pcmag.com/infolink.

• Sys Technology wasn't kidding when it named the Performance Pro series. The two screamers in this roundup bowled over the competition in their respective classes, making either unit a good standalone PC. Sys provides a decent service-and-support package, but desktop management features are scanty; large corporate customers may want to pass on these systems.

On our LANDesk-based DMI testing, we found that neither machine had a chassis intrusion detector or functional hardware monitoring. Remote restart, shutdown, and Wake on LAN features worked properly, however. The PCs used conventional cases, requiring tools for interior access. —JAH

Tagram Platinum T5700, T5300

Platinum T5700: Pentium II/450, 9.6GB disk, 17-inch monitor, SDRAM; High-End Winstone 99: 23.8. \$1,899 direct. **Platinum T5300:** Pentium II/266, 9.6GB disk, 15-inch monitor, SDRAM; Business Winstone 99: 15.5. \$1,249 direct. Costa Mesa, CA; 800-824-7267, 714-979-8900; www.tagram.com; 541 at www.pcmag.com/infolink.

• While the Tagram PCs are good performers and easy to service, neither came ready for management. Smaller networked environments prepared to configure management software on their own may be content with these units. Both systems came in nonlocking cases, but neither had a chassis intrusion detector. The Platinum T5300 came with an Intel LANDesk Client Manager 3.11 CD, but it was not installed. The Platinum T5700 came with LANDesk setup files, but the software was not ready for use.

A 48-hour parts-replacement service is included for the first year, and both PCs come with system recovery CDs. —RSA

Tangent Medallion BX 400, 300

BX 400: Pentium II/400, 9.6GB disk, 15-inch LCD monitor, SDRAM; High-End Winstone 99: 23.2. \$3,195 direct. **BX 300:** Pentium II/333, 6.1GB disk, 17-inch monitor, SDRAM; Business Winstone 99: 13.3. \$1,495 direct. Burlingame, CA; 888-826-4368, 650-342-9388; www.tangent.com; 542 at www.pcmag.com/infolink.

• The Tangent Medallion BX 400 is an adequate managed PC, but the Medallion BX 300 had trouble with some remote functions. More seriously, both PCs came with overclocked CPUs, which could cause CPU failure (we corrected the clock speeds before testing).

Both systems came in nonlockable cases with chassis intrusion detectors. The BX 400 came with Intel LANDesk Client Manager 3.3.

It displayed asset data and could be rebooted and shut down remotely, but it could not monitor internal fans. The BX 300 reported asset data; it could monitor temperature and fan speed, but it failed to reboot properly. And since it had Version 3.0 of LANDesk, it could not be shut down remotely. —RSA

Toshiba Equium 7100D, 7000S

7100D: Pentium II/400, 6.1GB disk, 17-inch monitor, SDRAM; High-End Winstone: 22. \$2,630 street. **7000S:** Pentium II/333, 4.1GB disk, 17-inch monitor, SDRAM; Business Winstone: 15.2. \$1,670 street. Irvine, CA; 800-867-4422, 949-598-7802; www.toshiba.com; 544 at www.pcmag.com/infolink.

• Introduced just over a year ago, Toshiba's managed PCs—though far better than many of the systems in this roundup—are still a step behind those from Compaq, HP, and IBM. Offering tool-free chassis and NLX motherboards, the Toshiba Equium 7100D and 7000S afford respectable management and relatively accessible hardware but have little storage space and limited upgrade options. Both were poor performers on our disk and graphics tests.

There are some problems with the units' cases. Though removing the 7100D's mother-



board is easy, thanks to the unit's clever side-open design, getting it back in is difficult; Toshiba is working on the problem. The 7000S has the same motherboard problem and also has a hard-to-open case.

Both systems, preloaded with Intel LANDesk 3.2, provide good if average remote management, perform extensive system inventory, and can monitor voltage and temperature. Also, Toshiba preloads its own SMS Connect agent (which works with Microsoft SMS) and bundles a Configuration Builder CD. Toshiba earned average marks on our Service and Reliability Survey. —CM

Total Peripherals Serengeti BX350

Pentium II/350, 4.1GB disk, 17-inch monitor, SDRAM; Business Winstone: 16.9. \$1,720 street. Northboro, MA; 800-923-7718, 508-393-1777; www.totalpc.com; 544 at www.pcmag.com/infolink.

• The Total Peripherals Serengeti has few management features and is overpriced as a standalone PC. Most notably, the system lacks an LM78 ASIC, making hardware monitoring impossible, although asset data was gathered. It came with LANDesk 3.0, which does not allow you to reboot or power the system remotely. There are also no free IRQs. —CM

Unicent Avanta L300

Pentium II/300, 6.1GB disk, 15-inch monitor, SDRAM; Business Winstone: 15. \$1,249 direct. Aurora, Ohio; 800-319-9250; www.unicent.com; 546 at www.pcmag.com/infolink.

• Unicent's Avanta L300 isn't fancy, but the price is right, and the company provides good manuals and support. Smaller offices may want to take a closer look. The chassis does not have an intrusion detector, but asset data was displayed and hardware monitoring and remote restart, shutdown, and Wake on LAN all worked. Performance was average. —JAH

Xi 400 MTower SP, MTower CSP

MTower SP: Pentium II/400, 8.0GB disk, 17-inch monitor, SDRAM; High-End Winstone 99: 26.3. \$2,049 direct. **MTower CSP:** Pentium II/400, 13.8GB disk, 17-inch monitor, SDRAM; Business Winstone 99: 19.2. \$1,999 direct. 800-432-0486, 714-498-0858; www.xicomputer.com; 548 at www.pcmag.com/infolink.

• The two Xi systems offer solid performance and room for expansion but are otherwise unremarkable corporate PCs, best suited for smaller offices. Both came in lockable mid-tower cases but lacked intrusion detectors, a \$15 option. Both units provide adequate asset data and are able to reboot remotely. The MTower CSP reported data on fans but, with Version 3.0 of LANDesk, could not be shut down remotely. The MTower SP had Version 3.3; it could be shut down remotely but did not provide fan information.

Technical support lines are answered 24 hours a day, but late-night enquiries are forwarded to on-call technicians. The units have a short, one-year warranty. —RSA

Zenon Z-Corp

Pentium II/300, 8.6GB disk, 15-inch monitor, SDRAM; Business Winstone: 15.3. \$950 direct. City of Industry, CA; 800-899-6119, 626-935-1860; www.zenontech.com; 549 at www.pcmag.com/infolink.

• Certainly the Zenon Z-Corp has this roundup's lowest price tag. This mainstream system is problematic, however: It has a screw-fastened chassis, lacks an AGP slot (AGP is integrated), and Zenon chose not to preload the system with LANDesk (preferring to bundle the CD). The unit's performance was mostly average save for a very low graphics score. —CM

SAVE UP TO \$19.99

Look for specially marked boxes at your favorite software store.

VISIT A WEB SITE AND THEY'LL PROBABLY GIVE YOU A COOKIE.

(LIKE MOST THINGS, THIS IS NOT AS GOOD AS IT SOUNDS.)

While you may love the Web, you probably don't know too much about how it works technically — a fact that many web sites take full advantage of. So while you're viewing one of their pages, they're secretly dumping files onto your computer. Like cookies. Little ID tags that let them monitor your activities on their site. And beyond.

But wait, there's more. They'll also send you ActiveX controls. Browser plug-ins. And an endless stream of graphics files. All hitching a ride on your overwhelmed hard drive as it stumbles and sashes its way around the Web.

New Version 4.1



CleanSweep gets rid of Internet clutter and uninstalls unwanted software.

One solution? Destroy the Web.

Another solution? CleanSweep® from Quarterdeck®.

CleanSweep is a compact application that rids your hard drive of Internet clutter. With a simple click of a button. But it doesn't stop there. CleanSweep provides powerful hard drive clean-up, tossing out old versions of software and unwanted files. Optimizing your computer for what you really want to do.

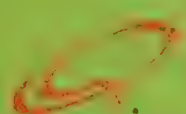
Devour the Web.

If you think that's impressive, you're not alone. CleanSweep was awarded the Editors' Choice Award from PC Magazine, who said, "...no other uninstaller does Windows as well as CleanSweep."

We even think CleanSweep is pretty hot ourselves.

That's why we're making CleanSweep available for networked PCs with CleanSweep for Administrators, as well as including it in the new Quarterdeck Utility Pack. And offering a 90-day money-back guarantee. So visit your local Quarterdeck retailer and give CleanSweep a shot. You'll discover what may be the most remarkable attribute of all. It's as good as it sounds.

For more information, call 800-354-3222.



QUARTERDECK.
www.quarterdeck.com

Mitsubishi Is Changing The Face Of Desktop Monitors.

The Finesse Of Flat: Introducing Mitsubishi's Diamond Pro[®] 900u With The Breakthrough DIAMONDTRON NF™ CRT.

Mitsubishi's new DIAMONDTRON NF (Natural Flat) CRT technology represents an unprecedented improvement in the way you'll look at monitors from this moment on. The revolutionary, truly flat-faced CRT creates distortion-free, intuitively correct images that are much easier on your eyes. Conventional CRTs produce curves and distortions that are hard on your eyes, increasing fatigue and reducing productivity.



You've come to expect crisp, clear images from Mitsubishi's award-winning DIAMONDTRON monitors, and now the innovative Diamond Pro 900u takes monitor performance to an even higher level. The Diamond Pro 900u delivers consistently accurate image quality – side to side, center to corner. In addition, Mitsubishi's patented CRT manufacturing process makes the Diamond Pro 900u stay brighter up to twice as long as conventional CRT designs. First in a family of DIAMONDTRON NF monitors, the 19-inch (18.0-inch DVI*) Diamond Pro 900u has a maximum resolution of 1600 x 1200/75 Hz. For added flexibility it also features a self-powered USB hub that two independent computers may share the display and a single set of USB devices. DIAMONDTRON NF monitors are just flat-out better. For more information contact Mitsubishi Electronics today.

USA: 800-843-2515 • Canada: 800-387-9630
QWIKFAX: 800-937-2094
www.mitsubishi-display.com/pb/pmg/900u



©1998 Mitsubishi Electronics America, Inc. DIAMONDTRON NF is a trademark of Mitsubishi Electric Corporation. Microsoft, Windows and the Windows logo are registered trademarks of Microsoft Corporation. Macintosh and the Macintosh logo are trademarks of Apple Computer, Inc. *DVI (Digital Video Interface)

 **MITSUBISHI**
DISPLAY PRODUCTS
Innovation On Display_{sm}

Choose 280 at www.pcmag.com/infolink

Web Search Sites

BY DAVID LIDSKY
AND NANCY SIRAPYAN

Find it On the Web



We've all heard the popular consensus: Finding information on the Web can be a challenge at best. We test 82 sites to tell you which ones really help you find what you want.

One recent study claims that frequent Web surfers are more likely to be depressed. They must be using the wrong search engine.

Choosing the right tools to search the Web, and we stress the plural *tools*, can make all the difference in how you experience it. Your mood will definitely improve once you know how to mine the Web for information as effectively as possible. We test 14 general-interest, 4 kid-friendly, 7 metasearch, and 5 news search sites to help you select the ones best for you. We also offer you more than 50 sites in 31 niche categories to help you find everything from acronyms to ZIP codes.

The key to determining which engines to select is knowing what type of information you're looking for. You should use a site like Yahoo! or Google! for broad, topic-level queries, such as *veterinary medicine*, where you are looking just for the best site on the Web on a subject. These sites are also best when you are looking for a particular URL, such as the National Institutes of Health home page.

When you're looking for a very specific piece of information, like how Doppler radar got its name, you may want to use a search site like Northern Light, HotBot, or AltaVista, which provides you with more unbridled power. These sites let you fashion a highly detailed query that should ultimately steer you to what you want. You may also want to try a specialized search site that has assembled a narrowly focused data-

General Search Sites	202
Kids' Search Sites	220
News Search Sites	222
Editors' Choice	205
Search While You Surf	212
Metasearch Sites	216
A Tool for Every Task	224

JOIN US ONLINE

Read our reviews and then try out these search sites yourself at our Super-Search Station, which will easily link you to these sites.

www.pcmag.com

Disclosure

Ziff-Davis, publisher of *PC Magazine*, produces ZDNet, which in turn licenses content to many sites and is a stockholder in DejaNews. Softbank, Ziff-Davis's primary shareholder, is an investor in Yahoo! and TalkCity (On Now).

base on a particular topic. You will often be able to make your query more context-specific and home in on what interests you.

The tools you'll find at your disposal on the Web are smarter than ever, although we admit they're far from perfect.

General search sites work hard to try to anticipate the intent of your search. Most general sites now look at the most common queries they receive

and surface the related information that they think you want.

Google!, a new site out of search engine incubator Stanford University (Excite, Yahoo!), is so confident of its accuracy that it dares you to go directly to your query's number-one return. Uncannily, it often wins that bet—so you do, too.

Direct Hit (available on HotBot) furthers this trend by putting the power in the user's hands. It tells you the ten most-visited sites for your query. All of these anticipatory features generally work well and are a boon to users, but they are most useful for general searches.

Searchers also get some more power at their disposal from sites that parse their databases in ways that make it easier to find specific information. For example, Lycos has stocks database and a recipes section, so you can easily separate your flavorful stocks from your fiscal ones.

What's on the horizon? More search customization features, saved queries that you can update at any time, still more anticipatory tools (including one called Clever from IBM Research), and a continued proliferation of sites focused on individual needs. So cheer up, you'll find what you're looking for.

General Search Sites



AltaVista

www.altavista.com Strong returns, intricate searching capabilities, and a large database make AltaVista a great search engine for the intermediate to experienced user. But its interface deficiencies make it less user-friendly than the comparable Northern Light or HotBot.

You'll find that AltaVista handles fairly simple search terms well—and complex terms with less common words. For example, a search for *GNP of the Dominican Republic* will bear more fruit than a search for *weekly box office receipts*; the engine does not automatically recognize *box office* as a single concept.

That's where advanced searching comes into play, and we found the options available to improve simple search results most impressive. The hitch is that the user must first learn the site's search syntax. Although it's not difficult to learn (for example, search for pages at **www.pcmag.com** using **host:pcmag.com**), working with pull-down menus and check boxes such as those on HotBot and Excite would make the searches more efficient.

Returns are preceded by "AltaVista knows the answers to..."—an anticipatory tool that provides search results from Ask Jeeves (**www.askjeeves.com**), and we found that it worked well.—Trevor A. Dawes

Electric Library Personal Edition

www.elibrary.com An intriguing but flawed site, Electric Library Personal Edi-

tion (\$9.95 per month or \$59.95 per year) houses all of its content, which gives the site some advantages in how it presents its material. But this also hampers it: Electric Library's universe is more limited than that of other search sites.

Electric Library offers high-quality content from a variety of sources, including magazines, newspapers, books, wire services, photos, and maps, as well as transcripts from television, radio shows, and government hearings. Some of this material is available free on the Web, so you're paying for the aggregation.

That's not necessarily bad though. Results are returned based on relevance,

useful information, although Electric Library is definitely better at returning research-oriented results than specific information. You'll rarely be directed to a primary source, so a search for *sub-\$1,000 PCs*, for example, may bring up articles on the phenomenon but not the Web site of anyone selling them.—Nancy E. Friedland

Excite

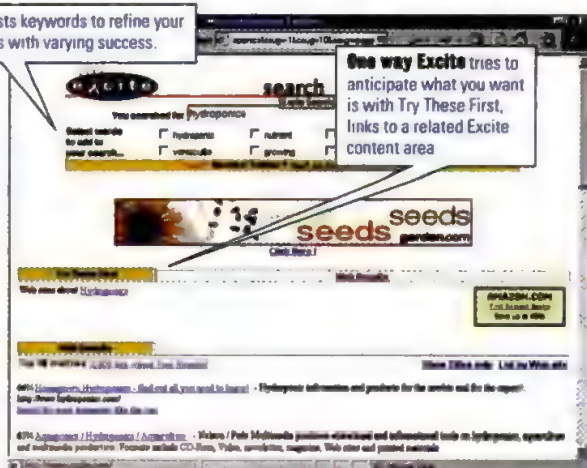
www.excite.com Much like its portal siblings Lycos and Infoseek, Excite is stuck in the middle regarding Web searches these days. Though it has easy searching techniques and some notable anticipatory features for beginning to intermediate users,

it's not as good as Yahoo! at finding you that one site, and Excite can't compete with the power-searching prowess of Northern Light or HotBot.

In testing, simple searches often returned good results. But using Excite's Power Search significantly improves results over simple keyword searches. You can customize your Excite query, by word or phrase restriction and domain searching,

but HotBot has more features. And the Power Search does not let you input Boolean operators; they are implied by the interface settings you choose (*must*, *must not*, or *can contain*). It's ironic that

Excite suggests keywords to refine your query; it works with varying success.



but you can easily sort the list by date, page size, or reading level—something Electric Library can do because it has screened all the material on the service.

Our searches generally produced some

"All day long, I'm on the move. I need color printers that can go like the wind."

PHIL BENNETT
DIR. OF SALES & MKTG.,
THE HINCKLEY CO.
CUSTOM YACHT BUILDERS



Optra
Color 40



Optra Color 45



Optra
SC 1275



Optra
Color 1200

When speed counts, you can count on Lexmark. The new OPTRA™ COLOR FAMILY PRINTS UP TO 12 COLOR PAGES PER MINUTE — TWICE AS FAST AS MOST COLOR PRINTERS. AND THE LESS TIME YOU SPEND PRINTING SALES MATERIAL, THE MORE TIME YOU HAVE FOR OTHER SAILS.

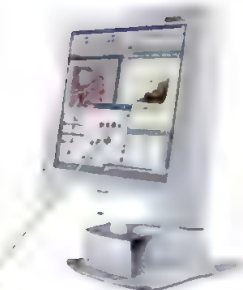
YOU TOLD US YOU WANT TO PRINT QUICKLY, CLEARLY, EASILY AND INEXPENSIVELY — JUST AS YOU DO IN BLACK & WHITE. WITH THE BRILLIANCE OF VIVID COLOR. SO OUR OPTRA COLOR FAMILY DOES JUST THAT — AT PRICES AS LOW AS \$449.* CALL 1-800-LEXMARK (1-800-539-6275) OR VISIT US AT WWW.LEXMARK.COM/E/ TO SEE HOW THE OPTRA COLOR FAMILY BLOWS BY THE COMPETITION. *EXACTLY WHAT YOU WANT...IN PRINT.*

LEXMARK

©1998 Lexmark International, Inc. All rights reserved. *Estimated street price. Prices may vary. Lexmark, Lexmark with diamond design, and Optra are trademarks of Lexmark International, Inc. registered in the United States and/or other countries. Other trademarks are property of their respective owners.

Choose 094 at www.pcmag.com/infolink

COLORFUL PEOPLE FOR LEXMARK



Flat Panel Series
With TFT LCD Technology

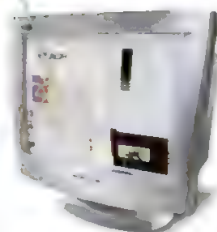
everyone has a vision



Professional Series
With CrystalClear Technology



Business Series
With Advanced Business Audio



Standard Series
For Business & Home Applications

WE'LL HELP YOU SEE IT. Philips' quality, global availability, warranty and 48-hour Monitor Replacement Guarantee have made us the choice of major companies, including Boeing and TCI. It's no wonder we're the second-largest manufacturer of monitors worldwide. So whatever your company's goals, we have a monitor to help you get there. Call 800-835-3506 or **www.philips-monitors.com**

© 1998 Philips Consumer Electronics

Choose 151 at www.pcmag.com/infolink



PHILIPS

Let's make things better

Editors' Choice



You'll get the most out of the Web if you use these essential search tools.

Simple searching: Yahoo!

Still the leader, Yahoo!'s unmatched directory makes it the destination when you're looking for just one site, particularly on a general topic. Its cross-references and category and site matches steer you right to what you want. Newcomer Google! deserves an honorable mention for its generally uncanny ability to find a great hit for your number-one result.

Advanced searching: Northern Light

Last year's rookie of the year is now an all-star. Northern Light's addition of

advanced searching features to its formidable database, as well as folders for organizing your returns, gives power users all the tools they need to find almost anything on the Web. It also includes the Special Collection of more than 4,500 publications, which adds depth to your Web searches and gives you more power than anyone else can offer.

No one lets you parse and filter your query in more ways than HotBot does, for which it earns an honorable mention.

Kids' search: Ask Jeeves for Kids

Your kids' results are served. Ask Jeeves for Kids simply directs kids to one or two resources right off the bat for both academic and social topics, with a metasearch backup to round out the package. For older kids who need more power, Lycos SafetyNet is Lycos with built-in protection for screening out objectionable material.

News search: None

Call us dreamers, but we wanted a news search site that had everything. Alas, all of the sites we reviewed are fundamentally flawed in some way. We recommend that you cobble together the best tools from the sites we looked at, using Northern Light News for headline searches, Yahoo! News for well-rounded current-events research, and Excite NewsTracker to follow topics of interest.

Metasearch: MetaCrawler

It doesn't try to search every site under the sun, yet MetaCrawler emerges as the best for querying multiple engines at once, because the sites it does search it searches well. You create your customized search page, and returns are well organized with duplicate returns eliminated. SavvySearch is also notable for its high-quality returns set, but it is slightly hampered by some flakiness in the control it gives you.

the power search limits the power of the user to define the search terms.—TAD

Google!

google.stanford.edu Searching the Web has increasingly become a two-stage process—execute a search, then wade through the results trying to find what you're actually looking for. Google!, an ongoing research project at Stanford University, helps you access the most relevant finds more quickly, and rivals Yahoo! for finding that handful of key sites you may be looking for.

The site's unique PageRank function indicates how many Web pages point to a particular document. Google! uses PageRank to decide which documents in the result set you might want to see first. For example, when searching for the National Institutes of Health, we entered the acronym NIH, and the NIH home page appeared at the top of our list. Google! is so confident that it includes an "I'm feeling lucky" button that retrieves Google!'s top pick for your search.

Google!'s large collection of cached pages is equally useful. We found ourselves visiting a document's cached page to assess its relevance, then linking to the

live page for time-sensitive information.

If you're used to performing complex Boolean searches, you'll find Google!'s search capabilities limiting. It really offers only simple keyword searching.



The ability to truncate search terms would be a welcome addition to this promising new site.—Breck Witte

GoTo.com

www.goto.com You won't find a more straightforward interface than GoTo.com's. Basically, you can only type in a keyword query. The site permits no further customization of a search once it has been run, and you have to learn advanced features from the Search Tips section, as

with AltaVista. GoTo.com uses Inktomi's search engine (also the power behind HotBot and MSN Web Search, and the backup at Yahoo!), so your results are

pretty good for a simple search, although the engine is not as good as Google!'s or Yahoo!'s at finding you that one key site. And if you want the power to refine your query or create a complex one, you're better off at HotBot.

The one overt twist that GoTo.com adds to the Inktomi results is an advertising scheme that enables companies to "bid" on search terms, which will push their listings to the top of the results screen. A search for a popular topic (or a particularly commercial one) will show the cost to

the advertiser for where they appear in the result ranking. More esoteric queries such as *Toni Morrison's Beloved* won't yield any bids, but they will still return a decent set of results.—Deborah Wassertzug

HotBot

www.hotbot.com Advanced search capabilities, a large Web index, and unparalleled graphical query-building aids make HotBot a valuable tool for both experi-



Do I have to spend everything I have
to get the technology my business needs?

You want performance technology at prices you can afford. Well, Compaq has what you're looking for. Take the Compaq Armada 3500, for example. With features like the Intel® Pentium® II processor 266 MHz in a 4.4-lb. package, it can satisfy all of your business needs – including your budget. And you can order it by calling us directly or visiting our website. More technology and more ways to get it. It's what makes Compaq computers the best selling in the business.

Compaq Armada Notebooks

Armada 1573

The ultimate value in a fully integrated notebook.

\$1,599*

Leasing Price: \$54/Month¹

- Mobile Intel Pentium Processor with MMX™ technology 233 MHz
- 3.2 GB² SMART Hard Drive
- 32 MB RAM (expandable to 96 MB)
- 12.1" CSTN SVGA display
- 20X Max³ CD-ROM
- K56flex modem⁴
- Integrated AC Adapter
- Li-Ion battery
- 1-year limited warranty⁵

Armada 1700

The fully integrated notebook from Compaq that combines the latest key technology with uncompromising value.

\$2,799*

Leasing price: \$95/Month¹

- Mobile Intel Pentium II Processor 266 MHz
- 4.0 GB² SMART Hard Drive
- 32 MB SDRAM (expandable to 160 MB)
- 13.3" TFT (1024 x 768) display
- 24X Max³ CD-ROM, optional DVD
- K56flex modem⁴
- Integrated AC Adapter
- Multibay design
- 1-year limited warranty⁵



*All prices shown are Compaq DirectPlus prices and are subject to change. Prices do not include applicable state and local sales tax or shipping to recipient's destination. ¹Leasing available through Compaq Capital Corporation (CCC) to qualified commercial customers, subject to credit approval and execution of CCC lease documentation. Monthly lease payments are based on 36-month fair market value lease, and do not include taxes, fees, or shipping charges. Offering subject to other restrictions and CCC reserves the right to change, alter, or cancel this offering at any time without notice. ²For hard drives, GB = billion bytes. ³20X Max CD-ROM data transfer rates may vary from 150 KB/s to 3000 KB/s; 24X Max CD-ROM data transfer rates may vary from 150 KB/s to 3600 KB/s; 32X Max CD-ROM data transfer rates may vary from 150 KB/s to 4800 KB/s. ⁴Designed only to allow faster downloads from K56flex-compliant sources. Maximum achievable download transmission rates currently do not reach 56 KB/s, and will vary with certain line conditions. ⁵Software is prebundled and will come with limited user documentation. ⁶Some restrictions and exclusions apply. Call (800) OK COMPAQ for warranty details. ©1998 Compaq Computer Corporation. All rights reserved. Compaq, the Compaq Logo, Armada, ProLiant, Compaq Insight Manager, and SmartStart are registered trademarks and DirectPlus is a registered service mark of Compaq Computer Corporation. Intel, the Intel Inside Logo, and Pentium are registered trademarks and MMX and Celeron are trademarks of Intel Corporation. Other products mentioned herein may be trademarks or registered trademarks of their respective companies. Operating system pre-installed on all portable products. Compaq is not liable for editorial, pictorial, or typographical errors in this advertisement.



Compaq Deskpro EP Series

Model 6300A/4300

The business computer for those who crave the latest industry-standard technologies, at very aggressive pricing.

\$1,259*

Leasing price: \$43/Month¹

- Intel Celeron™ Processor 300A MHz
- 4.3 GB² SMART II Hard Drive
- 32 MB SDRAM
- Compaq S700 17" (15.7" viewable) monitor
- Matrox MGA AGP Graphics
- Towerable chassis converts from desktop to minitower
- 3-year limited warranty⁶

Model 6350/10000/CDS

Provides the latest in performance technology in a simple, flexible design that configures to the workplace. The option is open for either a desktop or minitower system.

\$1,979*

Leasing price: \$67/Month¹

- Intel Pentium II Processor 350 MHz
- 10 GB² SMART II Hard Drive
- 64 MB SDRAM
- Compaq S700 17" (15.7" viewable) monitor
- Matrox Millennium AGP Graphics with 8MB VRAM
- 32X Max³ CD-ROM
- Towerable chassis converts from desktop to minitower
- 3-year limited warranty⁶

Model 6450/10000/CDS

Delivers true value by providing the ultimate in desktop quality and reliability. It offers a broad range of innovative, cost-effective, and flexible solutions.

\$2,239*

Leasing price: \$76/Month¹

- Intel Pentium II Processor 450 MHz
- 10 GB² SMART II Hard Drive
- 64 MB SDRAM
- Compaq S700 17" (15.7" viewable) monitor
- Matrox Millennium AGP Graphics with 8 MB VRAM
- 32X Max³ CD-ROM
- Towerable chassis converts from desktop to minitower
- 3-year limited warranty⁶

Options

Deskpro EP Series:

- Additional 32 MB SDRAM Memory: **\$79***
- 32X Max³ CD-ROM: **\$139***
- Upgrade to Compaq S900 19" (18" viewable) monitor: **\$220***
- SuperDisk LS-120 Drive: **\$119***
- Compaq C-Series 810 Handheld: **\$499***



Compaq Armada Notebooks

Armada 3500

The lightest notebook from Compaq, weighing only 4.4lbs.

\$2,799*

Leasing price: \$95/month¹

- Mobile Intel Pentium II Processor 266 MHz
- 4.1 GB² SMART Hard Drive
- 32 MB RAM (expandable to 160 MB)
- 12.1" TFT SVGA display
- 512 KB L2 Cache
- Optional CD-ROM or DVD via Mobile Expansion Unit
- 4.4 lbs. and 1.3" thin
- Magnesium display for durability
- 3-year limited warranty⁶

Armada 7400

The lightweight, durable notebook delivering a combination of high performance, desktop equivalence, and mobility.

\$3,499*

Leasing price: \$119/month¹

- Mobile Intel Pentium II Processor 300 MHz
- 6.4 GB² SMART Hard Drive
- 64 MB SDRAM (expandable to 256 MB)
- 13.3" TFT (1024 x 768) display
- Powerful AGP graphics
- 24X Max³ CD-ROM
- Optional ArmadaStation Expansion Base
- Around 6 lbs. and only 1.6" thin
- Magnesium casing for durability
- 3-year limited warranty⁶



Compaq Servers

ProLiant 800

The workgroup server that offers an innovative solution for customers looking for affordable next-generation performance.

\$3,104*

Leasing price: \$105/Month¹

- Intel Pentium II Processor 350 MHz
- 4.3 GB² Wide-Ultra SCSI-3 Hard Disk
- 64 MB SDRAM DIMM Memory (upgradable to 512 MB)
- 10/100 TX UTP (embedded) Ethernet Controller
- 24X Max³ CD-ROM
- Compaq Insight Manager, SmartStart⁵
- Compaq V55 15" (13.7" viewable) monitor, with 1-year warranty⁶
- 3-year on-site limited warranty⁶

Options

Armada 1700:

- Compaq Value Case: **\$49***
- 32 MB Memory Module: **\$89***

Armada 3500:

- Mobile Expansion Unit 24X Max³ CD-ROM: **\$199***
- Mobile Expansion Unit with DVD: **\$399***
- Additional Li-Ion battery: **\$209***

Armada 7400:

- ArmadaStation II Expansion Base: **\$879***
- Additional Li-Ion Battery: **\$189***

Buy direct from Compaq at 1 800-888-2454
Or visit www.directplus.compaq.com/pcm

or if you prefer, call 1 800-AT-COMPAQ for a reseller near you.

COMPAQ
DirectPlus

Better answers.™

**.WORK THE
WEB.**



ThE TURN Of ThE THUMB-screw.

It was a dark and stormy night, Monday no less. From the bowels of Pistons, Inc., came howls of triumphant laughter. For weeks, Mike, the IT Director, had felt the pinch of their tech costs and his management's mandate to cut them. They always seemed to be robbing Peter to pay Paul for PCs, printers and software upgrades. Plus more departments needed ¹(more customized AS/400 apps). Something had to change. Earlier that day he had met with his ²(partner), who told him how he could ratchet their company into an e-business machine without paying through the nose. So you're saying, Mike asked, that we can ³(Web-enable our AS/400s) while ⁴(turbocharging our e-mail system)? Yes, the partner said. Implement ⁵(document management) and ⁶(integrate my AS/400 data with PC applications)? Yes. Everything? Yes, and very quickly too, the partner added. Now as he read through the proposal he'd present tomorrow, he again laughed the laugh of some mad scientist and shouted: Get ready Betty, I'm happy whappy! Just then there was a knock at his door. The security guard looked in and asked, Everything all right, sir? Couldn't be better, said Mike smiling.

THE ⁷(HAPPIEST MOMENTS) OF HIS DAY WERE MADE POSSIBLE BY LOTUS.

¹Lotus Business Partners provide thousands of Domino™ apps. ²AS/400 partner. ³Utilize Lotus Notes Designer for Domino.™

⁴Rectify Y2K messaging issues. ⁵Domino.Doc. ⁶Lotus Notes® and Domino. ⁷www.lotus.com/worktheweb



enced and novice searchers. But Northern Light has the edge for power searchers because it can match many of HotBot's advanced search features, and its Custom Search Folders are better at steering you to the results you want from a results set of generally comparable quality.

Lycos acquired HotBot in its purchase of Wired Digital, but HotBot will retain its identity and features.

In addition to supporting Boolean syntax, wild cards, and case-sensitive searching, HotBot also offers a variety of filtering options, including media type, page depth, and pornographic content. All the search features can be set through dropdown menus and radio buttons—or you can bypass the interface assistance and construct your own queries using standard Boolean syntax.

HotBot typically does quite well on simple keyword queries if the terms are fairly specific, such as *guerrilla marketing*, but it is less adept than Yahoo! at searches on more general or common terms. To address this, HotBot recently integrated the Direct Hit Popularity Engine, which supplements your results set with a helpful list of the ten most-visited sites for your query.—Nancy Sirapyan

Infoseek

www.infoseek.com A lackluster and often inconsistent search engine, Infoseek really doesn't have much to distinguish it from its many competitors. Its returns are average at

best, and its most notable features can be found at better search sites. Around the time you read this, Infoseek will become part of a larger portal, orchestrated by Disney, its significant investor, called Go Network (www.go.com). Infoseek will be the

search and navigation arm of Go.

Simple searches on Infoseek yielded mixed results. Sometimes we got great results, as in our search for *Dobsonian telescopes*. Sometimes our results were technically relevant but of poor quality; we got mostly links to entertainment pages on our search for *Kissinger*. And in our search for *Alliance90/Greens* (a German political group), we got only three sites, and they were barely relevant.

Using the advanced search option right from the start is the way to go if you plan to use Infoseek at all. On the whole, queries submitted using the Advanced Search form do a better job of finding useful information than the simple search does.—DW

LookSmart

www.looksmart.com Navigating your way through LookSmart's directory of subjects is a good way to find some of the most popular sites on the Web within major categories. Although its hierarchical design is easy to use and a refreshing change from other search sites, the deeper you go, the faster you'll realize that LookSmart's content is lacking when compared with that on Yahoo!

As an example, when we searched on the keyword *hydroponics*, LookSmart returned 17 category hits all of which were relevant sites. The same search at Yahoo! returned 6 category matches and 156 site matches.

You can start with a keyword query if you can't find what you want in the categories. Your first returns will steer you into LookSmart's categories, and subsequent returns will be from the entire Web courtesy of AltaVista's search

Search While You Surf

Whether search engines? If two companies—one being Web stalwart Netscape Communications Corp., the other a start-up named Alexa Internet—have their way, Yahoo! and all the rest will be obsolete.

In the latest version of Communicator (4.5), Netscape has introduced Smart Browsing, which lets you type common terms into the location field, then sends you to the site with

Alexa steers you to links related to where you're visiting even pages deep into a site



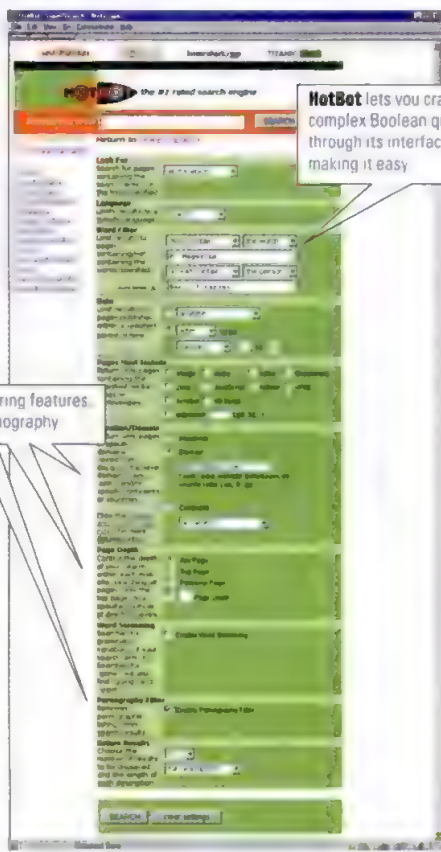
Alexa (www.alexa.com) is a free utility for either Netscape Navigator or Microsoft Internet Explorer that provides you with statistics, such as company location, on the site you're viewing as well as a list of ten related links. Communicator also includes Alexa's list of ten related sites in the form of a feature called What's Related. What's Related functions as a companion feature to Smart Browsing without needing the Alexa utility.

Though the new browsing enhancements built into Communicator are definitely smart, they're not always wise, except when it comes to keeping you firmly planted on Netcenter soil. Typing *Motown* for example will send you to the Motown site, but usually your entries will send you to Netcenter, which may not necessarily be what you had in mind.

Alexa 3.0, which we looked at in public beta, generally found us relevant links no matter where we were on the Web, but Alexa's far from perfect. We were impressed that we could often get related links on a page-specific basis (go to the Inter@ctive Investor section of ZDNet and get links to other financial sites, not computer sites), but we found that Alexa wasn't yet smart enough to steer us to sites related to content on personal home pages like GeoCities.

Though certainly no replacement for searching heavyweights such as Yahoo! and its siblings, Alexa and Netscape's Smart Browsing are handy and can cut down on the dross that often accompanies traditional Web searching.

—Sarah L. Roberts-Witt





Yesterday, you
needed all this.



Today, this is all
you need.

The reliable HP All-in-One does it all:
Prints, Scans, Copies and Faxes.

Completing your work just got easier thanks to the HP All-in-One.

Now, in one product, you get a professional quality printer, scanner, copier, and in some models a fax machine too.

So instead of wasting your time managing multiple products, the HP All-in-One helps you get your work done faster and more efficiently.

Every HP All-in-One is engineered for years

of reliable performance and backed by award-winning HP Customer Care and a one-year warranty.

Rather than using up all your desk space with four separate machines – get the one machine that does it all.

The HP All-In-One. Dependable. Easy to use. Designed to work smoothly with no compromise in quality or performance.



HP offers a variety of machines to fit your needs and budget. Prices start at just \$299. Stop in and try one today.

Available at:

OfficeMax

For the nearest store, please call 1-800-788-8080.

www.hp.com/go/all-in-one

hp **HEWLETT®
PACKARD**

Expanding Possibilities

©1998 Hewlett-Packard Company

You live in a three dimensional
Now you can work



RABBIT SALES PRESENTATION 1998.JPG

File Edit View Image Colors Masks Selections Capture Window Help



amd@work

world.
in one, too.



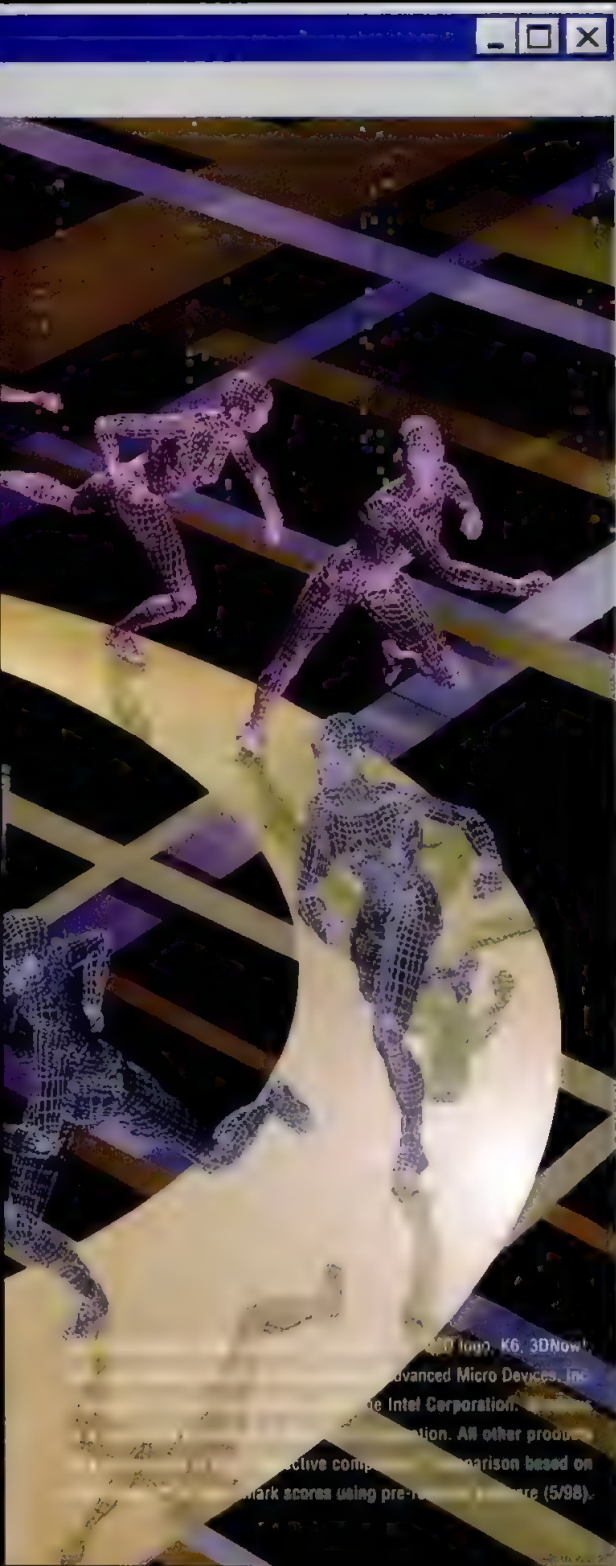
The AMD-K6-2 Processor
with 3DNow! Technology

Presenting the next dimension in PC technology.

Sales presentations that jump off the screen. 3D charts that inspire. QuickTime™ movies that make the computer screen feel like the big screen. You've always seen it in your head. Now see it on your PC with the AMD-K6®-2 Processor with 3DNow!™ You get sharp 3D imaging, smooth video playback and incredibly fast multimedia from the Internet, DVD or CD-ROMs. Even sound is more lifelike. It makes Windows® applications like word processing, spreadsheets and desktop publishing run at lightning speed. What's more, our new 3DNow! technology lets you see 3D applications like LiveArt '98, DVExpress, and Baseball 3D the way they were meant to be seen. The fact is, the AMD-K6-2 Processor with 3DNow! outperforms Pentium® II.* More importantly, it adds a new dimension to your work environment. The third. Get more information. Visit us at www.amd.com/business.

AMD

www.amd.com



Metasearch Sites

Why search one site when you can search a bunch at once? See which sites are most effective at power searching the Web.—*Eyal Rabinovitch*

Search engines queried	Search control	Results: organization/quality
Debriefing www.debriefing.com ★★☆☆☆ In the English version: AltaVista, Excite, HotBot, Infoseek, Lycos, WebCrawler, and Yahoo! Also a French version	★★☆☆☆ Basic Search by keyword or Advanced Search, which offers options for timing out searches, limiting the number of displayed results, and searching specific domains	★★★★★ Accurate returns Ranks all returns by relevance and tells which engine retrieved them Deletes duplicates Offers related keywords for refining your search
Dogpile www.dogpile.com ★★★★★ AltaVista, Excite, Excite Guide, GoTo.com, Infoseek, Lycos, Lycos's A2Z, Magellan, PlanetSearch, Thunderstone, What-U-Seek, WebCrawler, Yahoo! Also searches business news, FTP, news wires, stock quotes, and Usenet	★★★★★ You can choose up to two areas to search together (such as Web and FTP sites) and the amount of time to wait for results Use Custom to query all 25 supported engines. A hidden Advanced Search lets you pick the engines you want to employ	★★★★★ No integrated returns, making quality of results subpar Returns grouped by site and ordered from the most specific to the most general (that is, from Yahoo! to Infoseek news wires)
Highway 61 www.highway61.com ★★☆☆☆ Excite, Infoseek, Lycos, WebCrawler, Yahoo!, and Yahoo! categories	★★☆☆☆ Options include Boolean operators, a time-out setting, and choice of volume of results No phrase searching	★★☆☆☆ Ranked, integrated returns, which tell you which engine produced each site Average to above-average returns
Mamma www.mamma.com ★★★★★ AltaVista, Excite, HotBot, Infoseek, InfoSpace's Ultimate Directory, Lycos, WebCrawler, and Yahoo! Also searches MP3 files and news articles	★★★★★ Default lets you search a given area (such as the Web or Usenet) by any or all keywords, or by all keywords as a phrase Power search lets you pick engines	★★★★★ Quality of returns is average—sometimes right on, other times full of excess sites Doesn't delete duplicate returns and repeats often
MetaCrawler www.metacrawler.com ★★☆☆☆ AltaVista, Excite, Infoseek, InfoSpace's Ultimate Directory, Lycos, Thunderstone, WebCrawler, and Yahoo!	★★☆☆☆ Default and Power Search pages almost identical to Mamma's, but you can make a customized search page and keep preferences for future searches.	★★☆☆☆ Above-average results, although not as strong as SavvySearch's. Integrates returns and gives them a reliable quality ranking. Checks for dead links
ProFusion www.profusion.com ★★☆☆☆ AltaVista, Excite, GoTo.com, Infoseek, Lycos, Magellan, Snap, WebCrawler, and Yahoo! Also searches Usenet	★★★★★ Boolean, phrase, or keyword searches You can choose which engines to query together Choose either the three engines that best fit your search or the three fastest Saves settings	★★★★★ The best at translating even complex Boolean operators to the syntax of each engine, but returns are often average Returns integrated, but no info on the source of an individual hit
SavvySearch www.savvysearch.com ★★★★★ AltaVista, Excite, HotBot, Infoseek, Lycos, Open Text, WebCrawler Also searches directories, indexes, people finders, Usenet, and more	★★★★★ Default search page lets you select from many different search areas Search by any or all keywords or by all keywords as a phrase, and determine the number of results that come from each engine	★★★★★ Among the highest quality returns Returns can either be integrated or batched by engine Many search areas were never used, however, and others were used even when not selected

engine. But LookSmart doesn't offer AltaVista's power search features. So if you want to use complex search queries, go straight to AltaVista, or better yet use Northern Light or HotBot.—*DW*

Lycos

www.lycos.com Visit Lycos and you'll find a lot going on, but for searches, none of the site's features or tools are compelling enough to give it an edge over Yahoo! for beginning to intermediate users. And for power searching, Lycos is outmatched by Northern Light and HotBot in features and results.

Lycos performs fairly well on simple

keyword queries entered without any special syntax, although we did run into quite a few dead links. The more keywords you enter for a simple search, the less likely you are to get quality results. You should probably try to build your query in Lycos's advanced search, Lycos Pro, which handled complex queries well. You won't find any particularly notable

advanced search functions here as you will at HotBot, but what is here works.

Lycos tries as hard as any site in this roundup to anticipate what you want from your query, but it does so without much intelligence. The site reflexively plugs your query into a predefined formula that returns a "Check These Out" section with links to stores, GTE Yellow Pages, and a dictionary, whether they are relevant or not.—*DW*

MSN Web Search

search.msn.com Using Inktomi, the same core search engine employed by HotBot, MSN Web Search is basically a pared-down version of the power search veteran. You are limited at MSN, because it has fewer search options, and although we got good quality returns, you might as well go to HotBot.

Advanced search options at MSN require no special syntax and are entered using a series of pull-down menus with Boolean, date, domain, language, and media search options. We particularly missed the support for nested Boolean queries found at HotBot.

We found advanced search options accurately focused results on more relevant sites, particularly limiting keywords by exact phrase, words in title, Boolean phrase, and domain. Simple searches did well too; however, relevancy rankings were not always consistent. Generally, keywords found in the hit title were listed first, and results in which the keyword was found on the main page were also listed high. There were frequent duplicate returns and occasional "file not found" errors.—*NEF*

NewHoo!

www.newhoo.com The idea behind NewHoo! is that a group of volunteer editors with a personal interest in a given subject area can produce a subject-categorized site better than Yahoo! But this produces biased editorial content, and with its flawed search engine, NewHoo! amounts to a bad Yahoo! knockoff.

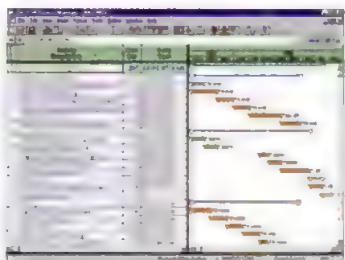
Our Contributors: NANCY SIRAPYAN is the librarian at *PC Magazine*. TREVOR A. DAWES is a library specialist, and NANCY E. FRIEDLAND, DEBORAH WASSERTZUG, and BRECK WITTE are librarians at Columbia University. BARB FALKINBURG is a librarian for the Baltimore County public schools. JILL LÉGER, EYAL RABINOVITCH, and SARAH L. ROBERTS-WITT are freelance writers. JAY MUNRO was the project leader, and DAVID LIDSKY was the associate editor in charge of this story.

Laugh in the face of deadlines.

SureTrak. Project management success from start to finish.

Project deadlines—they're no laughing matter. So when they hand you the big project, you can be glad there's SureTrak Project Manager.™

SureTrak helps you organize and manage every aspect of every project. Just 30 minutes with the Project KickStart™ wizard maps out a realistic plan. Interactive PERT charts and graphics help you organize, prioritize and manage all



your resources and tasks.

What if something changes? (And it always does.)

SureTrak's powerful

analysis tools let you compare resources, deadlines and costs, to make the smartest tradeoffs. Reporting features let you sort, summarize and prioritize by responsibility, phase or resource. SureTrak's Progress Spotlight™ makes updates a breeze. And integrated e-mail and Web publishing communicate the latest updates, status reports and assignments to your team.

SureTrak Project Manager gives you

The Power to Save Time.™

SureTrak. Plan to succeed.

Call 1-800-973-1335, or visit

www.primavera.com/suretrak.html

today for a FREE multimedia CD-ROM.



PRIMAVERA
How the world manages projects

1-800-973-1335 www.primavera.com/suretrak.html



Choose 148 at www.pcmag.com/infolink



Users can search the NewHoo! directory with simple keywords or with a hand-entered complex Boolean search. Unfortunately, there is an editorial bias to search results, because of gaps in subject coverage. For example, when we searched for *capital punishment*, we received a single hit in opposition to the practice. But when we executed the same search on Yahoo!, we received a large number of hits both in support and in opposition.

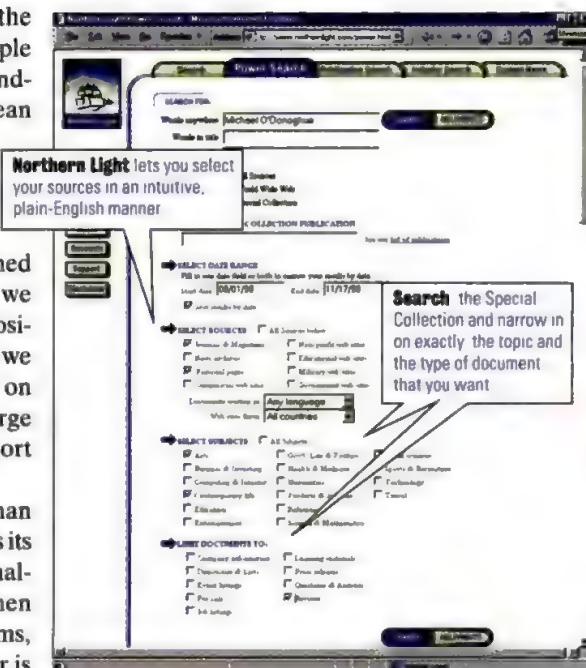
Perhaps more fatal than NewHoo!'s biased coverage is its search engine, which often malfunctions undetectably. When you enter multiple search terms, the default Boolean operator is *and*, but if no results are found with this conjunction, the operator is changed to *or* without warning. Hence the search *cat dog* returns 11 hits, but *cat dog bird* returns 375. If this is intended to be a copy of Yahoo!'s "intelligent default," NewHoo! clearly has some more work to do.—BW

Northern Light

www.northernlight.com Unique among the sites in this roundup, Northern Light is both an Internet search engine and a fee-based database service. Its advanced search features, the innovative way it organizes results into subsets, and the availability of its fee-based content enable Northern Light to edge out HotBot as our Editors' Choice.

Northern Light's uncluttered interface hides a wealth of powerful features, including support for Boolean syntax, nested queries, wild cards, and truncation. The Power Search page offers additional refinements such as field searching and the ability to limit a search by date, language, or domain. During our tests, Northern Light had an uncanny ability to turn up relevant hits, particularly for very specific and detailed queries. For common queries, try Yahoo! instead.

We were impressed with Northern Light's sorting ability, which essentially refines your search. It dynamically groups hits into custom folders based on subject,



document type, source, and language.

The site's Special Collection also sets it apart from the others. This fee-based database offers the full text of more than 4,500 periodicals, scholarly journals, and news wires, which you can search separately or in conjunction with the Web.—NS

WebCrawler

www.webcrawler.com Part of Excite's network, WebCrawler can be best thought of as "Excite Lite"—a simple search alternative for less experienced users. But WebCrawler, though effective at simple searches, didn't really compare with some of its simple search counterparts such as Google! and GoTo.com for finding that one destination site.

Although WebCrawler is good at simple searches, the longer the search term entered, the less likely you are to receive relevant results. A search for *GNP of Dominican Republic* found several sites on the Dominican Republic, and several sites on GNP, but none with the two together. We found relevant sites with other comparable engines.

WebCrawler also does not handle punctuation well, even with phrase searching. Our search for musical artist

Des'ree yielded mixed results.

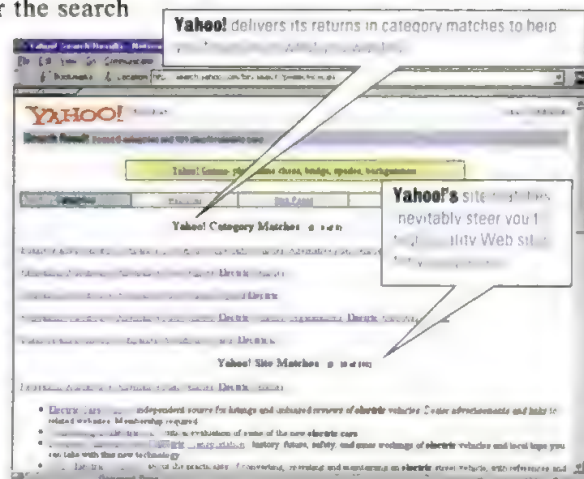
WebCrawler does support Boolean operators to help you with advanced searches, but the site has no advanced search page like Excite's or Infoseek's; you have to go to the help pages and learn the syntax. For a site designed for quick and easy searching, this disappointed us.—TAD

Yahoo!

www.yahoo.com Continuing to hold a strong grip on its position as the number-one Internet search site, Yahoo!'s breadth of coverage and ease of use make it appealing for both novice and experienced users. With a collection of more than 500,000 hand-picked sites classified into more than 25,000 categories, Yahoo! makes an excellent starting point for both browsing and searching.

Yahoo!'s strong suits are its content and organization more than its search features. We were usually able to zero in quickly on its coverage of a topic with simple keyword and phrase searches and did not need to use Boolean operators.

Because humans add and categorize the pages in Yahoo!'s database, which encompasses popular as well as scholarly topics, a search will invariably yield a smaller but more focused results set with better quality returns. Yahoo! and newcomer Google! were the only sites in our roundup to return highly relevant hits consistently, even on searches for very general or common terms such as *Internet standards*. But for very specific terms, you may have better luck with a more comprehensive Web indexing site such as Northern Light or Alta Vista.—NS



On one hand, your server operating system is about keeping the network up and running.

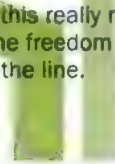
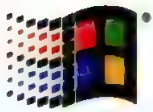
There is, however, the other hand.

Microsoft® Windows NT® Server 4.0 runs both your network and your business applications. This is an important distinction.

It means you won't spend your days figuring out how to cobble together business solutions, because more parts of your network will be tightly integrated. It means your network can do more now, do it more efficiently, and give you fewer headaches over what the future holds. It means Windows NT Server is a true multipurpose server operating system.

It all starts with great file and print. (In fact, Windows NT Server 4.0 is a 25% faster file server than NetWare 5.) Then, when you're ready, it lets you take advantage of the latest network functions.

What this really means for you is a solid foundation, and the freedom to grow into whatever you need down the line.



Kids' Search Sites



As the Web becomes both after-school clubhouse and homework helper to more and more young people, wary parents look for safe havens for their children on the Internet. A number of search sites aimed squarely at kids have sprung up looking to please both kids and their parents. We look at four sites, considering ease of use, quality of returns, and suitability for social and academic use.

Ask Jeeves for Kids



www.ajkids.com With a clean interface, an excellent database of answers, and nice touches like spell checking on your queries, Ask Jeeves for Kids (AJ) does a good job narrowing the results down so as not to be too overwhelming while still giving you the flexibility to find more information. For middle school kids and younger, this is the best search site we've seen.

Rather than presenting a plethora of sites like other search engines do, AJ tries to find one or two which are relevant. We achieved better results with AJ by enclosing keyword phrases in quotation marks. We found good sites on a wide variety of both academic and personal interest topics for younger kids. We searched for *John Kennedy*, and the two sites we got back were a site with information about President Kennedy and an encyclopedia article about him.

Should you want more, Ask Jeeves for Kids also sends your query to AltaVista, Excite, Infoseek, Lycos, WebCrawler, and Yahooligans! Their top responses are filtered through SurfWatch to provide a safe environment.

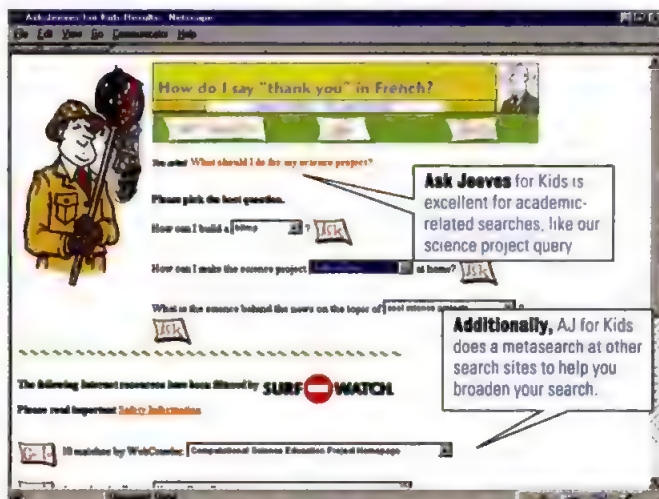
One caveat: The sites you're sent to are returned within a frame, which can cause navigation difficulties for some browsers. It also obscures from you which site you're visiting.—*Barb Falkenburg*

Disney's Internet Guide

www.dig.com A strongly commercialized database that shunts on academic content, Disney's Internet Guide (DIG) is well designed and intuitive to use but ultimately disappointing. DIG needs to

improve its search algorithms and expand its database before it can possibly contend with Yahooligans! for fun stuff and Ask Jeeves for Kids for everything.

You can browse by category or do keyword searches, but you may be better off doing the former. We found sites on telescopes by browsing through the site that we could not pull up using keywords. Results from keyword searches were



inconsistent. A popular topic search (i.e., *Beanie Babies*) yielded the official Ty site well down the list. And we struggled to find any info on the Los Angeles Lakers until we used the somewhat unlikely query *NBA Lakers*.

Academic-related searches delivered poor results. We couldn't find any relevant information on silkworms and little on how the heart works, and occasionally, unexplainable results were returned: Searching for human teeth returned sites on dog breeds.—*BF*

Lycos SafetyNet

personal.lycos.com/safetynet/safetynet.asp Lycos SafetyNet, the Lycos engine with a filter designed to protect against inappropriate and questionable sites, was the most powerful site in this roundup,

with a large database and a strong search algorithm. The regular Lycos interface and a problem relating to chat rooms and message boards incline us to give Ask Jeeves for Kids the nod for Editors' Choice. Lycos SafetyNet is appropriate for the more sophisticated information needs of kids seventh grade and up—with the appropriate controls in place.

Because you are using the Lycos engine, this is the only kids site with true advanced searching strategies available. In order to activate SafetyNet, parents must go to a preferences page where personal information and a password are entered. A choice to either allow or forbid access to chat rooms, e-mail, and message boards appears as an extra safety feature, although enabling the chat room feature didn't block us from entering Lycos's chat area or message boards.

We found that it successfully blocked sites from searches requesting questionable content though. Lycos SafetyNet can be turned off by entering the password.—*BF*

Yahooligans!

www.yahooligans.com Perhaps the most impressive aspect of Yahoo! is its excellent and varied directory, but its kids-only version, Yahooligans!, doesn't measure up to the Yahoo! standard. Most of the site's listings come by suggestion, leaving Yahooligans! top-heavy with

sites designed to meet the social needs of 8- to 12-year-old users—chat rooms, downloadable games, pictures of Leonardo DiCaprio, and the like. Anything of an academic nature is either absent or in short supply.

Like Yahoo!, the primary arrangement of Yahooligans! is by category. A wide variety of categories with many subcategories enables the searcher to refine and narrow topics while generating further ideas for keywords.

Also like Yahoo!, search results are displayed in separate sections, first by category and then by specific site. Site listings also display by category, which may cause confusion. As noted, searches for anything that might have to do with school—*hydroponics* or *Minutemen*, for example—yielded very few or no relevant sites.—*BF*



When they want the next big thing, how will your network take the news?

Let's say you've got the basics handled, then the CEO decides you need a complete communications solution. From server-based messaging to a Virtual Private Network, your solution will cross the line between your applications platform and your network OS. Microsoft® Windows NT® Server's unique multipurpose design will handle the crossover.

And if someone decides your future is e-commerce, or you simply decide to build an intranet, you won't need an army of coders and system managers to get you there. Why? Because multipurpose means that Web services, application services, security and management are integrated—they all work together.

So, when you choose Windows NT Server, you prepare yourself for the changing needs of today's networks.

News Search Sites



Whether for breaking news of another wild stock market ride or just for daily tracking of your industry's doings, the Web has become the source for the scoop. We look at five news search sites, looking for those with tools that search intelligently for information on the big news of the day from a wide variety of sources. We also wanted links to additional Web resources to round out our view on major stories, and a clipping service to let us track particular topics every day—all in an integrated and intuitive site interface. We found the best of all these tools, but not at any one site. Read on, and choose the tools most important to you.

Dow Jones Interactive

www.dowjones.com If you need ongoing access to a wealth of business and finance news, Dow Jones Interactive stands out from its competitors, because of its library of more than 5,500 publications and its excellent CustomClips news clipping service. Of course, all this content will cost you (\$69 per year, \$2.95 per full-text article, and \$9.95 per month per topic for CustomClips), making Dow Jones best suited for corporate rather than individual use.

In spite of its strong business focus, Dow Jones also delivered accurate results on general news queries. You can use advanced search features such as Boolean operators, word truncation, and proximity searches—all of which worked well.

CustomClips lets you set up folders, each containing a topic like *IBM* or *banking* that you want to follow. Dow Jones's CustomClips beats out Excite's and Yahoo!'s free clipper services, because it archives your articles. The free services save only your topics.—NEF

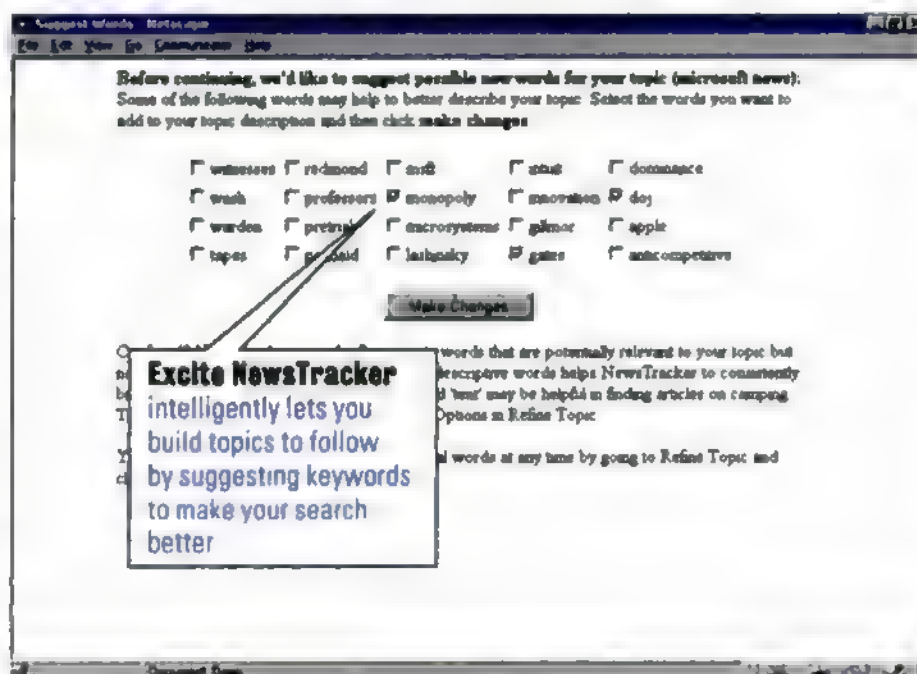
Excite News

nt.excite.com Sortable results sets and an excellent clipping service make Excite News a good free source for finding news. Nevertheless, too many irrelevant hits when compared with Northern Light makes us recommend it solely for its clipping service.

Excite News's best feature is its NewsTracker clipping service. NewsTracker has a suggestion feature that helps you refine your topics intelligently, so when

we wanted to track *Microsoft* and *antitrust*, NewsTracker helpfully suggested we add *monopoly*, *Gates*, and *Intel* to our search topic to improve results.

Daily news searches usually returned good current results, but often results sets were overwhelming and filled with irrelevant hits. Excite does best with simple



queries, like the name of a public figure. A good way to improve your results with multiword queries is to include a plus sign (+)—the “must appear” qualifier.—NEF

NewsEdge NewsPage

www.newspage.com If your sole interest is tracking news about companies and industries, NewsPage will do the job. But this misleading site offers little added value to what you can get using free services such as Northern Light News and Excite News.

NewsPage is free for the basic service, but you'll find that few articles are priced at the basic level; far more are available at the premium level. Signing up for premium service appears to be free, but after 30 days, you'll be asked to pay \$6.95 per month. Although you haven't turned over a credit card number, this kind of bait and switch is inexcusable.

To search for news, select the Search tab. On the whole, searches failed miserably. Repeated searches on key terms taken from that day's headlines frequently produced few results. NewsPage claims to support Boolean operators and phrase searching, but these qualifiers did not enhance search results.—NEF

Northern Light News

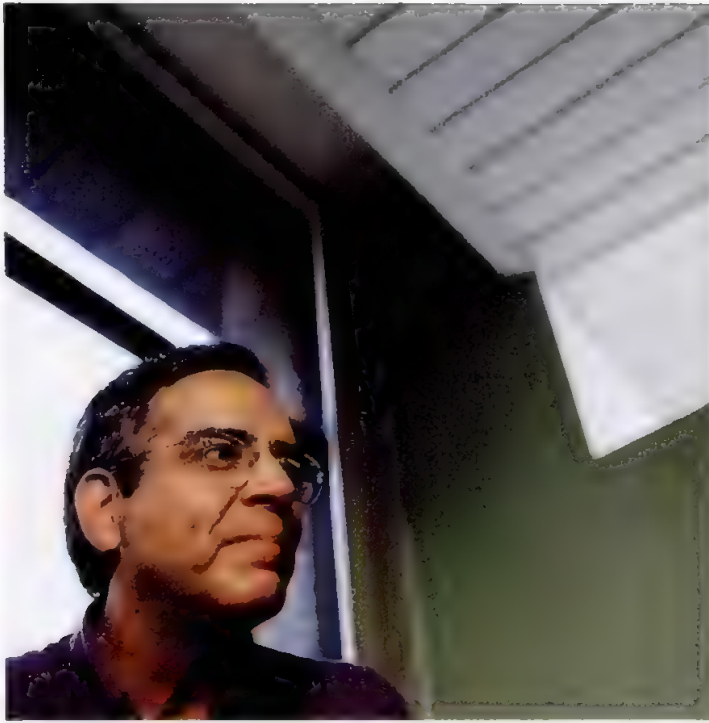
www.northernlight.com/news.html For quick, accurate news searches of more than 70 current news wire services, Northern Light News is a good place to go. In our testing, it provided excellent search returns without the overwhelming results we sometimes found at Excite News. It lacks any integration with the rest of its service, however, so you cannot seamlessly access related Web- or publication-based content as you can at Yahoo! News or Dow Jones Interactive, respectively.

Northern Light has more than 4,500 publications in its fee-based Special Collection, compared with 5,500 at Dow Jones. But unlike Dow Jones, Northern Light News will integrate Web results into its returns and has no base fee for use.—NEF

Yahoo! News

dailynews.yahoo.com For top headlines and an effective news-search engine, Yahoo! News works well for national and international searches and in all topical categories. But Yahoo!'s best news-related feature—the excellent Full Coverage—is not integrated with the news headlines. Full Coverage should be the primary reason to go to Yahoo! for news.

Type in the keywords *Alan Greenspan* at *dailynews.yahoo.com*, and you'll get plenty of links to news articles, mostly from major wire services. Type in the same keywords at Yahoo!'s general search page, *www.yahoo.com* and you'll get a link to Yahoo!'s Full Coverage, a well-organized page containing top headlines, related sites, audio and video clips, speech transcripts, and more. Full Coverage (*headlines.yahoo.com/full_coverage*) has been created for hundreds of topics in every major news category, and it's the best of its kind on the Web. Unfortunately, Full Coverage cannot be accessed from within Yahoo! News, and you cannot search within Full Coverage; you have to browse the topics.—NEF



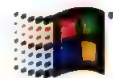
And what about tomorrow's network? Or tomorrow's Windows NT Server?

Chances are you won't immediately use every whistle and bell we've included in Microsoft® Windows NT® Server 4.0. These features will, however, be there when you need them tomorrow, and won't get in the way of network performance today.

With future versions of Windows NT Server, similar logic applies. In the same way that having a multipurpose OS lets you adapt to new solutions, Windows NT Server also gives you the flexibility to easily upgrade when you are ready.

Windows NT Server 4.0 lets you do what's right for today, and lets you prepare for the challenges ahead.

As you take the time to make the right server OS decision, you may want more detailed information. We've assembled some new resources for you at the Web address below.



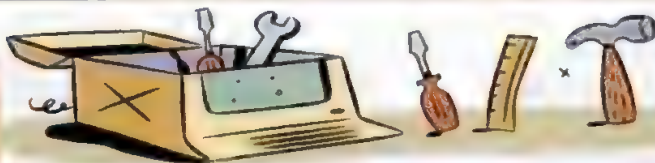
**Windows NT®
Server 4.0**

www.microsoft.com/go/WindowsNTServer/

Microsoft®

Where do you want to go today?®

A Tool for Every Task



Sometimes your search requires a specialized service, tailored exactly to what you're looking for. Here are 52 sites to help you solve 31 common needs.—Jill Léger

Find an acronym

Acronym Finder
www.mtnds.com/af

With more than 61,000 acronyms in the site's database, the Acronym Finder will help you decode that mysterious abbreviation, be it serious, whimsical, or both. Entering *SALT* for example retrieves both "Strategic Arms Limitation Talks" and "single and loving it." The site assumes a wild card after what you've entered, so returns are usually pretty comprehensive. An advanced search option lets you find an acronym by the words it abbreviates.

Find anyone

Yahoo! People Search
people.yahoo.com

Search on name, domain, city, or state to find e-mail and white-pages info. Returns from the white pages come with name, address, a linked phone number, and links to maps, whereas e-mail hits provide direct mailto links. Advanced e-mail searching lets you specify address as well as organization (such as a company or high school).

ALSO OF NOTE:
WhoWhere?
www.whowhere.com

Find an apartment

AllApartments
www.allapartments.com

Search for an apartment from the comfort of your own home. Enter a U.S. city and state (or any street, intersection, or ZIP code), then specify price range, unit type, and desired amenities. Returns include listings of apartment and property features as well as direct links to management. Some returns also come with info on the nearest schools, banks, grocery stores, and other community fixtures.

ALSO OF NOTE:
Rent Net
www.rent.net

Find an ATM

Visa and MasterCard
www.visa.com;
www.mastercard.com/atm

In a strange town and in need of cash? These sites can help you find automatic tellers around the world. Visa's ATM Locator lets you specify a street address or cross street, city, state, and ZIP code; the MasterCard/Cirrus ATM Locator lets you choose only region and location from a drop-down list (though big cities are usually broken down into neighborhoods).

Find an attorney

lawyers.com
www.lawyers.com

A great place to find an attorney and, just for kicks, get bios on the likes of Johnnie Cochran and other cable-TV talking heads. Select a city, state, and area of practice from drop-down lists to retrieve a list of firms with easy links to address, phone, and fax info. Advanced searching lets you specify lawyer or firm name and city, state, country, specialty, and language. Click on a name for a synopsis of an attorney's legal career.

ALSO OF NOTE:
West Legal Directory
www.wld.com

Find company information

Hoover's Online
www.boovers.com

An excellent resource for getting a snapshot of any company out there, Hoover's harbors info on some 13,500 public and private companies worldwide. Type in a company name, ticker symbol, keyword, or person's last name and get a company capsule that contains basic info, plus a synopsis of company history, a current stock quote, sales and sales growth data, net income, number of company employees, names of corporate officers, and CEO bios. For a \$12.95 monthly membership fee, take advantage of advanced searching capabilities and more.

ALSO OF NOTE:
Companies Online
www.companiesonline.com

Find a computer article

Computer Magazine Archive
cma.zdnet.com

Can't remember where you saw that article about the hot new scanner? ZDNet's Computer Magazine Archive lets you search more than 200,000 computer-related articles and abstracts from over 200 industry publications. You can search on keywords to pull up story titles, synopses, and dates, but access to the articles themselves—the chief charm of membership—costs \$69.95 for an annual subscription.

Find a definition

OneLook Dictionaries
www.onelook.com

Even the heftiest Webster's will seem like a slender volume next to OneLook. Here you'll find an index of almost 2 million words from several hundred dictionaries, many of which harbor not just definitions but pronunciation guides, antonyms, synonyms, and rhymes.

Enter a term into a keyword box (you can use wild cards for unknown letters) to retrieve a list of dictionary names and descriptions, each accompanied by a link to your word. Stephen Sondheim of the world, take note: Where else will you find 38 rhymes for *nonplussed*?

Find a discussion forum

Forum One
www.forumone.com

If you want to keep up with what people are saying about your company online, don't forget to check Web discussion forums. Search over 225,000 forum discussions by keyword or general-interest topic. Returns usually provide a link to the latest message posted as well as one to the forum host for easy access to registration. Advanced searching lets you employ simple Boolean operators (*AND*, *OR*, and *AND NOT*) to narrow your search.

Find a domain name

NetNames USA
www.netnamesusa.com

You may not specialize in hot gossip, but for 50 bucks, you can do what Matt Drudge did on February 14, 1997, and register your own domain name. Search here to determine the availability of a name, which if free can be registered from the site itself. You can also search on the name of any nonmilitary or nongovernment site to determine who registered it and when the site was created.

ALSO OF NOTE:
InterNIC
www.internic.net

Find driving directions

MapQuest
www.mapquest.com

Get door-to-door directions to any spot in the U.S. without sacrificing an ounce of pride at a midjunct service station stop. Simply enter the addresses of your origin and destination to retrieve a turn-by-turn map as well as a text description of your journey, complete with the mileage of each leg. Advanced door-to-door options let you avoid

ALSO OF NOTE:
MapBlast!
www.mapblast.com
routes involving major highways, local streets, ramps, and alleys.

Find a file

Filez
www.filez.com
An index of more than 7,000 FTP servers and the millions of files they contain, Filez lets you

access freeware and shareware archives, locate the latest version of your favorite programs, and find graphics, movie, and sound files. Search using a keyword box and drop-down lists that let you specify OS and file type. Returns comprise lists of matching filenames, complete with descriptions and date and size info. Click on a filename to retrieve a directory listing and to download locations and file data.

Find a high-tech company

Company Finder
www.companyfinder.com

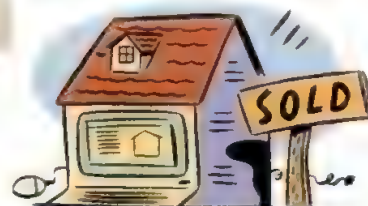
Need the basics on the next IPO highflier or that industry kingpin? ZDNet's Company Finder furnishes profiles of more than 4,700 high-tech companies. Search on company name or product category or browse companies alphabetically, selecting from a string of letters. Returns are packed with information ranging from the latest stock quote and quarterly income statement to a list of other products the company makes.

ALSO OF NOTE:
CorpTech Database of Technology Companies
www.corptech.com

Find a house

Realtor.com
www.realtor.com

Instead of aimlessly driving around looking for "for sale" signs, try this database of more than 1.3 million homes and nearly 500



realty services. A U.S. map lets you easily drill down to state and city, and a questionnaire invites you to specify price, room requirements, square footage, and preferred amenities. Returns rank listings according to how closely they match your stipulations, and usually feature photos and descriptions, as well as links to the realtor.

ALSO OF NOTE:
Microsoft HomeAdvisor
www.homeadvisor.com

Find an ISP

The List
thelist.internet.com

Change your Internet service provider (ISP) as often as you change your socks? You need The List, a buyers' guide to almost 5,000 ISPs across the U.S. and Canada. Click on an area code to retrieve a list of providers, replete with information on service speed and dedicated-service compatibility. Click on one

to access fee, phone, and Web site info. A keyword box on the front page is provided, but the search function is faulty: Searching on *MindSpring* and *EarthLink*, for example, turned up nothing.

Find a job

The CareerBuilder Network

www.careerbuilder.com
These virtual want ads let you specify job location, description, and salary requirements from drop-down lists and enter any specifics into a keyword box. Each drop-down box provides an "any" option, so you can search on, for example, all the available programming jobs in Ohio. Click on a listing for a more detailed description, as well as the option to e-mail a potential employer your resume.

ALSO OF NOTE
The Monster Board
www.monster.com

Find legislators' voting records

Project Vote Smart

www.vote-smart.org
If you suspect your elected officials have performed more flips than an Olympic gymnast, check out this site, which tracks the performance of more than 13,000 political leaders including governors, members of Congress, the president, and state legislators. Here you'll find biographies, campaign-funding info, positions on issues, and voting records. Links to other online resources help you expand your search.

Find a long-distance carrier

TeleWorth

www.teleworth.com
As this site will tell you, there are hundreds of long-distance companies besides AT&T, MCI, and Sprint, but we don't hear about them because they don't call during dinner every night. The site's TeleRate comparison engine culls its data on the big 3 (and 497 of their counterparts) to hook you up with the best carrier for you. Enter your area code and prefix, then use your latest phone bill to enter numbers dialed, the time of day for each call, and what you were charged. The site returns a list of rate plans, with easy links to sign up or acquire more information.

Find a mailing list

Liszt

www.liszt.com
Want to join a mailing list dedicated to Microsoft? "Ally McBeal"? Portugal? Classical music? Look no further than Liszt, a gamut-spanning directory of more than 90,000 mailing lists worldwide. Search on a keyword or browse a portal-like array of general categories to pull up a list of names and links to subscriber info. Limit your search with advanced search options such as wildcards.

Find medical information

Medical World Search

www.mwsearch.com

If it hurts when you do this, search this selected index of nearly 100,000 medical sites for articles and documents. Synonyms are automatically searched as well, so *colon cancer*, for example, will return all occurrences of *colon carcinoma* and *adenocarcinoma of the colon*. At the top of the returns list is usually a link to the term or phrase itself, which you can click to view a definition, description of relevant symptoms, and list of synonyms.

ALSO OF NOTE
Dr. Koop's Community
www.drkoop.com

Find a newsgroup

Deja News

www.dejanews.com
Your road map to the complicated hierarchy of newsgroups, Deja News lets you search on a keyword to pull up a list of postings ordered by date or browse portal-style channels to find forums on favorite topics. Power searching lets you specify subject, forum, author, and date, as well as sort by one of five parameters. Registering with the My Deja News service automatically subscribes you to forums that match your interests.

ALSO OF NOTE
Supernews
www.supernews.com

Find an old friend

ClassMates and PlanetAll

www.classmates.com;
www.planetall.com
Wonder whatever happened to your old high-school sweetheart? These sites specialize in helping you locate, if not old friends, then at least people who share your alma mater. Both maintain hefty memberships, which you can search according to high school, and PlanetAll extends the approach by letting you search also on university, graduate school, and employer. At Classmates, contact info will cost you \$20 for 36 months of service, while PlanetAll e-mails the people you'd like to contact to see if they'd agree to exchanging personal info.

ALSO OF NOTE
sixdegrees
www.sixdegrees.com

Find online events

On Now and Yahoo! Net Events

www.onnow.com; events.yahoo.com
Fifty-seven channels and nothing on? Try your TV Guides for the Web. Both sites let you search on keyword, and On Now gives you a home page with a list of events transpiring at the moment. Each provides links to today's events, as well as ongoing happenings, and each also lets you browse broad topics. Returns at each site comprise lists of event names, synopses, and dates, but only On Now gives you times up front.

Find a personal home page

WhoWhere? Personal Home Page Lookup

homepages.wbwhere.com
Can't remember whether your friends

planted their Web stake at GeoCities, at Tripod, or through their ISPs? This directory of personal home pages can help. You can use a keyword box to search on name, interest, or affiliation, or browse an assortment of categories such as languages, occupations, schools, and universities. Keyword searching pulls up a list of pages containing your term or phrase—however peripherally—complete with a page description and link.

Find public records

KnowX

www.knowx.com
Save yourself a trip to the county records office digging through musty files. After registering, you can search on any name to access a database of residences, death records, home values, and home buyers and sellers. You can also conduct what amounts to a background check, unearthing lawsuits, judgments, liens, UCC filings, and bankruptcies on anyone. And that's not all: You can also retrieve a business's corporate and sales tax records, verify professional licenses and executive affiliations, and identify property ownership and value. Such access will cost you, however: Per-record prices start at about a dollar.

Find stock filings

Edgar Online

www.edgar-online.com
Want to know what's really going on at that company in which you're investing? Cybernet's Edgar Online provides access to real-time filings with the Securities and Exchange Commission. An online counterpart to the government-run Edgar, which supplies the site with records, Edgar Online provides the full text of filings as well as related info like executive profiles. Advanced searching lets you retrieve a specific form, or all forms within a given date parameter. For-fee services (starting at \$9.95 per month) let you access today's filings, receive e-mail notification of new filings, and more.

ALSO OF NOTE
U.S. Securities and Exchange Commission
www.sec.gov

Find technical information

developer.com

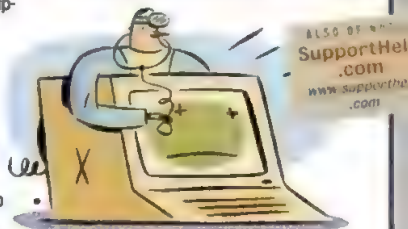
www.developer.com
Stuck at some crucial point in your development project? This online reference library of technical books and other information archives more than 14,000 resources to help you out. Enter a keyword to pull up returns, which typically include the document or chapter title and a summary. Click to retrieve the full text, usually accompanied by links to other chapters in the same book. The Directories section, categorized by technology, lets you search for applets, scripts, and white papers.

ALSO OF NOTE
DevSearch
www.devsearch.com

Find tech-support information

No Wonder

www.nowonder.com
Before you bash your computer into a heap of twisted circuitry, try this online technical-help center to help you solve your computer problems with blessed ease. The Resources area, a collaboration between No Wonder and ZDNet, is a searchable database of helpful



hints and FAQs. If that doesn't work, fill out a form describing your problem and you'll get a personal reply within 24 hours.

Find the weather

AccuWeather

www.accuweather.com
Access weather around the corner or around the globe. Enter a U.S. city or ZIP code to retrieve a five-day forecast, accompanied by satellite photos and a link to conditions for the week. Clicking on World pulls up satellite images of regions beyond and drop-down lists of countries and cities. If you are truly weather-obsessed, for \$39.95 a year you can access ten-day and hour-by-hour forecasts to plan that weekend getaway or that golf game.

ALSO OF NOTE
Weather.com
www.weather.com

Find yellow-pages information

Switchboard

www.switchboard.com
Search for businesses nationwide by entering a category in a keyword box or selecting from a drop-down list containing numerous classifications from *accountant* to *wrecker*. Then indicate any combination of business name, street, state, and ZIP. Returns comprise business names, addresses, and phone numbers, and each entry comes with easy links to maps and driving directions.

ALSO OF NOTE
Zip2
www.zip2.com

Find a ZIP code

United States Postal Service ZIP Code Lookup

www.usps.gov/nsc
Your letter carrier will love you if you use the services of this site, which retrieves a nine-digit ZIP code for any address you enter. Returns also include county name and, in case you were curious, carrier route number and route delivery points. There's also a section where you can access all the ZIP codes serving a specified city and vice versa.

ALSO OF NOTE
ZipInfo
www.zipinfo.com/search



Graphics so realistic, so vibrant, they bite back.

"The board's price, speed, and 3D quality - plus Matrox's reputation for solid, reliable products - make it a smart choice"

PC World, Oct. 1998

"The image quality is as close to perfect as I've seen so far"

Starline

"The G200 visual quality is the best we've ever seen."

3D Spotlight



October 1998



September 1998



The Millennium G200 delivers breathtaking 2D/3D graphics that don't compromise on speed.

Whether you're a corporate power user, a 2D/3D designer, or a hard core gamer, the Millennium G200 video card has the graphics power to accelerate all your demanding applications. All with true color image quality that will take your breath away.

Its new Vibrant Color Quality rendering architecture processes 32-bit color at ultra-high resolutions, so you get crisp, vivid colors with incredible image detail. By combining the revolutionary MGA-G200 architecture and full AGP 2X support, you get the fastest integrated 2D, 3D, and DVD video card - *bar none*. You can even choose between AGP 2X support with SGRAM memory or PCI support with SDRAM memory. And if that isn't enough, you can add on 8 MB of memory, Rainbow Runner G-Series for video editing and TV tuning, digital PanelLink™ support, and hardware DVD acceleration.

So even if you don't need to render monster size projects, Millennium G200 has everything you need for state-of-the-art performance. All at a price that won't take a big bite out of your budget.

► Visit our web site at www.matrox.com/mga or call 1-800-362-9343

Matrox outperforms the competition

WinBench 98 Business at 1280x1024x24bpp

Matrox Millennium G200 8MB AGP 1200

ATI SpeedWork 8MB AGP 1000

NVIDIA Vanta 128MB AGP 1000

3D WinBench 98 at 640x480x16bpp

Matrox Millennium G200 8MB AGP 1200

NVIDIA Vanta 128MB AGP 1000

ATI SpeedWork 8MB AGP 1000

* All tests were performed without independent verification by Z.M. Davis. Z.M. Davis makes no representations or warranties as to the result of the tests. WinBench, 3D WinBench and WinMark are trademarks of Z.M. Davis Inc. in the US and other countries. All tests performed with Windows 95/98 on a Dell Dimension 4340 configured with a 400MHz Pentium III and 64MB of RAM. WinBench 98 Business run at 1280x1024x24bpp/30fps. 3D WinBench 98 run at 640x480x16bpp/75Hz with DirectX 6.0 set to Draw Index Primitives. Matrox Millennium G200 configured with 8MB of SGRAM for the AGP bus and using driver revision 4.21. NVIDIA Vanta 128 configured with 8MB of SGRAM for the AGP bus and using driver revision 4.10.01.0780. ATI SpeedWork was configured with 8MB of SGRAM for the AGP bus and using driver revision 4.10.01.2611.

Choose 380 at www.pcmag.com/infolink

matrox

Hardware

IN THIS REVIEW

The battle to
rule the desktop
graphics market rages
on. PC Magazine Labs
tests the latest
cards based on
the hottest chips.

BioStar Crux 390	244
Canopus Spectra 2500	244
Creative Labs Graphics Blaster Riva TNT	251
Diamond Monster Fusion ..	252
Diamond Viper V550	252
ELSA Erezor II	257
ELSA Victory II	257
Great Magic Machspeed Raptor 740	257

graphics accelerators

Chip makers have been climbing over one another in recent years, in a crush to deliver faster and better 3-D rendering to the mainstream PC desktop. The problem is, the only immediate beneficiaries have been those who play games that use 3-D graphics. Thankfully, the coming year looks to be a win/win situation for all users, not just gamers.

The 29 accelerators we tested generally deliver much-improved 3-D performance—but not at the expense of resolution capabilities or 2-D prowess, as in previous years. More importantly, 1998 saw the introduction of 3-D data visualization and presentation applications that could emerge as the nongame 3-D “killer apps” of 1999 and beyond. Throw in Chromeffects, Microsoft’s multimedia extensions for adding 3-D effects to Web pages, and you’ve got a

Guillemot Maxi Gamer Phoenix	260
Hercules Terminator Beast T9318SD, T9328SG	260
Intel Express3D	280
Leadtek WinFast 3D S320 ..	265
Matrox Marvel G200-TV ..	265
Matrox Millennium G200 ..	265
Metabyte Wicked3D Vengeance	267
Number Nine Revolution IV 32MB	269
Number Nine Savage Reality 357	269
Prolink 3D Combo plus	269
Proside Trinosaur PRS-MP6000	271
Quantum3D Raven	271
Real 3D StarFighter	273
STB Nitro 3200	273
STB Velocity 4400	273
Performance Tests	234

who's

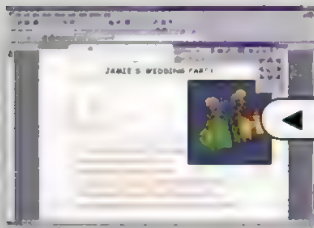
THE

FASTEST?

by jan ozer

3-D BUSINESS APPS FINALLY!

LiveArt 98 (\$50 street), from Viewpoint Datalabs (800-229-2738, www.viewpoint.com), uses 3-D to enhance its extraordinarily extensive collection of over 4,000 3-D clip-art objects. You can select images, or create your own by using the LiveArt Sketchpad, or by accessing the OLE 2.0 server application in OLE clients such as Microsoft Word or PowerPoint. The clip art is well catalogued with rudimentary search capabilities, and you can preview each object before selection. In addition to 3-D objects, there's a smattering of animations that can be played back from within PowerPoint. Once selected, you can choose from 35 rendering modes such as "chalk" and "toon" (which create objects that look like chalk outlines or cartoons).



live art

3D sensations



PowerPoint users seeking to jazz up their presentations will enjoy 3D Sensations for Presentations (\$50 street), from Crystal Graphics (800-394-0700, www.crystalgraphics.com), which produces real-time 3-D transitions with audio effects on any PC equipped with OpenGL, D3D hardware acceleration, and Direct X 5.0 or higher. 3D Sensations appears as a floating tool panel, with commands for adding and viewing 3-D transitions. We reviewed Volume 1, with over 60 individual transitions.

As with PowerPoint's own 2-D transitions, you can assign 3-D transitions to any slide or presentation. When you're ready to view the enhanced presentation, select View/Show. 3D Sensations then renders all transitions and stores them to disk. Systems equipped with 3-D hardware acceleration can play back transitions in real time, so be sure your laptop has this capability.

dynamic that could make 3-D graphics relevant in corporate space for the first time.

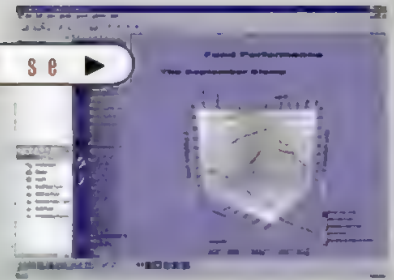
REVIEW CRITERIA

In this roundup, we test mainstream graphics cards that deliver 2-D and 3-D acceleration under Windows 9x, with Microsoft Direct3D API support. Each card had to include at least 8MB of local graphics memory and 1,024-by-768 resolution at 24-bit color depth (while maintaining a refresh rate of at least 85 Hz) and have a street price of \$300 or less. We also include two 3-D-only cards—the popular Diamond Monster 3D II and the Obsidian II from 3Dfx spin-off Quantum3D—to gauge how these hard-core gamer cards (built around

3Dfx's Voodoo2 chip and requiring a separate 2-D card) compare with the more mainstream 2-D/3-D offerings. Among the 18 vendors here, all the top-tier players are represented save two: ATI Technologies, our Editors' Choice recipient for two years running, which did not have boards based on its new Rage 128 chip in time for our testing; and 3D Labs, which is expected to release its Permedia 3 chip by year's end.

Driving the evolution of 3-D applications and games is the frenetic pace of development set by graphics vendors. The seven different chip sets powering the accelerators we tested here are all new in the past year. (For the lowdown on each chip's prowess and shortcomings, see the

Fremont SE (\$150 street), from Portola Dimensional Systems (888-868-9989, www.portolasystems.com), takes standard Excel files (and other files saved in CSV format) and plots their data on a 3-D grid for extended analysis. It's invaluable for professionals who use visual tools for analyzing or presenting spreadsheet data. To use the software, start by importing your spreadsheet file into Fremont, using chart wizards similar to Excel's that ask questions about data fields, labels, and the like. Dragging your data variables to the x, y, and z positions produces an animated 3-D chart illustrating your data points over time. Fremont offers 11 chart types, including stacked lines, vertical and horizontal bars, and a sphere model.



sidebar "It's All in the Chips.")

The most significant change in the current crop's makeup (aside from the new core chips) is that it includes much more on-board memory than in the past. Whereas 2MB and 4MB of memory were the norm at this price level a year or two ago, plummeting memory prices now let vendors equip their boards with 8MB, 16MB, or even (as with the \$200 Number Nine Revolution IV 32MB) 32MB of dedicated graphics RAM and still deliver affordable products. This extra memory is necessary for memory-hungry 3-D rendering and also enables the cards to deliver higher resolutions and color depths for the 17- and 19-inch monitors that have become more commonplace.

The new chip sets also deliver additional 3-D rendering features such as anisotropic filtering (which improves the look of texture images that are viewed at an angle), bump mapping (by which a surface can

Our Contributors: JAN OZER is a contributing editor, and JON HILL, JAMES KARNEY, and DON LABRIOLA are frequent contributors to *PC Magazine*. PETER N. GLASKOWSKY is a senior analyst at the *Microprocessor Report*. DAVID A. HARVEY is a freelance writer. S. JAE YANG was the project leader and JAMIE M. BSALES was the senior associate editor in charge of this story.

take on a relief texture), and reflection mapping (which accurately draws reflections of objects in glass, water, metal, and other reflective surfaces).

HAVOC IN THE LABS

No graphics accelerator roundup would be complete without a recounting of the role of PC Magazine Labs and especially ZDBOp (ZD Benchmark Operation) as a beta tester and traffic cop for the graphics industry. In this roundup, the ZD 3D WinMark 99 tests were literally the first DX6 application tested on most boards, revealing problems that required up to ten driver updates per vendor to resolve.

We don't mind helping vendors smooth out the rough edges of a brand-new product. But we do mind some of the driver optimizations made by the likes of Diamond Multimedia, Intel, and STB Systems that boost speed on our benchmark tests but deliver no true benefit to end users. For example, several boards didn't draw certain triangles less than 1 pixel in size, reducing the rendering task and slightly increasing 3-D benchmark test scores. This may sound reasonable, since it's tough to see triangles of less than 1 pixel. But many 3-D views use multiple subpixel triangles to draw one object, such as a tree receding in the distance, and in these cases, dropping triangles leads to obvious degradation. In addition, Microsoft's DX6 rules require the board to draw all triangles. Whenever we came across this optimization, we notified the vendor and were shipped a new driver.

A somewhat more blatant attack on the benchmark tests was made by the Real 3D StarFighter. During certain tests, our technicians noticed the display jerkiness that typically indicates dropped frames, though the board should not have dropped frames under the test as configured. To resolve the issue, we filmed the display with a video camera and stepped through the results frame by frame. This revealed that the StarFighter dropped 5 frames out of each 31 in order to raise its score noticeably on our older benchmark test suite. Once again, this anomaly had no impact on the scores published here. For more details, see this story's benchmark test section.

RAISING THE BAR

Such issues notwithstanding, the latest chips generally offer better speed. Standard

2-D-rendering performance for the applications most of us use most of the time—Adobe Photoshop, Microsoft Excel, and so on—is good across the board. All of the cards we tested performed at least acceptably on our ZD Business Winstone 99 test suite, which mirrors graphics performance using the top-selling Windows applications.

In 3-D rendering we saw a much wider speed delta. The new ZD 3D WinMark 99

gauges an accelerator's speed in rendering scenes using Microsoft's Direct3D API (application programming interface). This API provides one standard interface for the hardware 3-D acceleration features found on new chip sets. The boards we tested fall roughly into three performance strata. The fastest 3-D accelerators are the 11 entries based on the nVidia RIVA TNT or 3Dfx Voodoo Banshee chips, which



IT'S ALL IN THE CHIPS

The game of leapfrog among graphics-chip vendors continued at a furious pace this year, with newcomers doubling the 3-D performance and besting the features of chips released just six months prior. Here's our take on what you're likely to find on an accelerator near you. —Peter Glaskowsky.

ATI Rage 128

Unique features: Best-in-class cache architecture, dual-rendering pipelines, and a digital-TV decompression engine

Promises best 3-D and video performance of any single-chip accelerator to date, with support for 32MB of local memory for ultra-high-resolution rendering

Not shipping yet

ATI Rage Pro

Unique features: Best balance of 2-D, 3-D, and video features for home computers among chips last year

DVD-decoding assistance, low price

Performance has fallen behind that of newcomers

Chromatic Mpac2-2

Unique features: The only fully programmable graphics/video/audio chip ever made

Enables DVD playback even on slower systems

Weak 2-D and 3-D performance; Mpac development has been canceled

Intel i740

Unique features: Tile-based rasterization reduces frame-buffer hits for more efficient memory access during rendering

Very low cost

AGP-only texturing, low 3-D and merely acceptable 2-D performance, no 32-bit color support

Matrox MGA-G100

Unique features: None

Very low cost for business desktops

Relatively low performance for 3-D graphics

Matrox MGA-G200

Unique features: Dual-pipelined memory interface allows more efficient and flexible memory implementations

Excellent 2-D performance; good 3-D quality, relatively low cost

Only 64-bit memory; only average 3-D performance.

Number Nine Ticket to Ride IV

Unique features: Integrated digital LCD controller gives T2R4 an edge in the flat-panel race, can be configured for higher resolutions than any other announced graphics chip

Supports up to 32MB of 128-bit local memory; great 2-D engine

Behind the curve in 3-D performance

nVidia RIVA TNT

Unique features: Dual 3-D-rendering pipelines, each with a flexible texture-mapping engine for a top-tier pixel-drawing rate

Fast 128-bit local memory interface, good for 3-D modeling and other professional applications

No hardware DVD support

S3 Savage3D

Unique features: Fast trilinear filtering

Affordable performance and quality

Only 8MB of 64-bit local memory supported (most others support 16MB or more of 128-bit memory)

3Dfx Voodoo Banshee

Unique features: Only single-chip Voodoo product; one of the best VGA cores in the business

More affordable than Voodoo2 and faster for older software, still runs all Glide games

Slower for new multitexturing games

3Dfx Voodoo2

Unique features: Two-card mode allows better 3-D performance than any single-board accelerator

Runs Glide games; still the fastest solution for many 3-D games

Needs a separate 2-D card, maximum resolution of only 1,024 by 768, only 16-bit color

3D Labs Permedia 3

Unique features: Virtual texture memory mode loads only necessary pieces of texture maps for more efficient bus utilization

Fast dual-textured 3D and single-textured trilinear filtering for complex textures; innovative multilevel texel-caching scheme, integrated LCD controller

Too late for 1998

Should we call it E*TRADE 98?

Introducing the new E*TRADE. The Web's one-stop financial

All You Need to Invest

You can invest in stocks, options, and over 4,000 mutual funds. You also get cash management features like free checking, direct deposit, and competitive interest on uninvested funds. You can even get mortgages and a no-annual-fee VISA® card.

Control Your Portfolio

Set up and track your portfolio. Create watch lists of hot stocks and options. Get real-time views of what's moving the markets. Receive e-mail alerts on stock prices and P/E targets you set.

Still \$14.95 a Trade[†]

E*TRADE not only gives you free tools to track and manage your money, but you can place orders around the clock—online or by phone—and trade stocks for as low as \$14.95.



Open an account by 12/15/98 and get a \$50 sign-up bonus.
Call 1-800-ETRADE-1 (ext. 276) or go to www.etrade.com/pccomdex^{††}

*10x more research than previous generation Web site. [†]Nasdaq, limit, and stop orders are \$19.95. For listed orders over 5,000 shares, but with a credit of 12 free minutes per trade, you may pay nothing. Orders executed during market hours. ^{††}Open an account by 12/15/98. E*TRADE rated #1 online broker by Gomez Advisors' 3rd quarter report on Internet brokers, issued 8/12/98. Gomez Advisors

E*TRADE 2.0? Or E*TRADE kicks butt?

center. With 10x more research.* More tools. More power.

the New E*TRADE

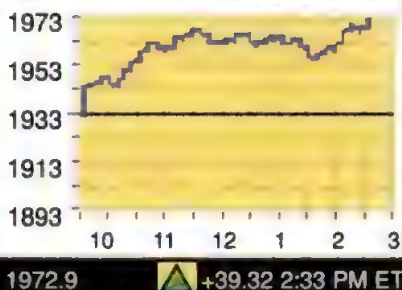
Trading | My Accounts | Community | Marketplace

ALEX'S VIEW



July 29, 1998 2:34 PM EDT

Tech Index



My Portfolio

Symbol	Price	Change
NKE	45 7/8	+1/4
DIS	35 3/16	-3 16
ORCL	26 3/4	+1/8
HNZ	55 5/8	-1 4
JNJ	78 15/16	+1/2

Most Actives

Sym	Price	Chg	Vol(000)
PG	80 1/16	-39 16	6413600
BA	39 1/16	-1/16	5663500
MU	32 5/8	+17/16	5612300
I	60 5/8	-11/16	5108300

release Q1 earnings.
affect large drug companies.
names new COO.

Free Ideas & Tools

Free investing help and education. Like mutual fund screening tools. Analyst views. And retirement planning calculators.

Free Real-Time Quotes

Because old information is bad information. Also get breaking news. Charts. Analysis from leading sources. Morningstar research. Upgrades. Downgrades. All for free.

Unsurpassed Security

Using the leading Internet encryption technology, E*TRADE offers unsurpassed privacy and security of your data.



Now open free to the public, 24 hours.

Someday, we'll all invest *this way*.®



E*TRADE®

add 1¢/share to the entire order. Add \$15 for broker-assisted trades. Direct modem and touchtone connect fees are 27¢/minute, and a credit of \$50.00 will post to your account within two weeks of account opening. Offer not valid on IRAs and other retirement accounts. is a leading independent authority on online financial services. ©1998 E*TRADE Securities, Inc. Member NASD, SIPC.

posted scores of 440 or above in 1,024-by-768 mode. The middle strata (scores of roughly 300 to 400) is populated by seven cards built around the Matrox MGA-G200 and the S3 Savage3D. The six slowest 3-D performers (scores below 200) use the Intel i740, Number Nine Ticket to Ride IV, or now-defunct Chromatic Research Mpact-2 chip.

DOES BUSINESS NEED 3-D?

It's about to. New applications targeted at corporate and other nongame consumers will soon make all these advances in speed and rendering quality very relevant indeed. The 3-D "killer apps" in the corporate space will likely be data visualization applications such as Fremont, from Portola Dimensional Systems (see the sidebar "3-D Business Apps: Finally!"). Data visualization has been a staple on workstation-class computers for years but has been too computationally intensive for desktop PCs.

These programs display data from spreadsheet or database applications in 3-D form, helping unlock correlation hidden in column- or record-based data. Some programs (including Fremont) display data in four dimensions by animating data changes over time. These programs enable Pentium II computers outfitted with Direct3D graphics hardware to replace the workstations currently required to perform these functions, spreading their use dramatically to smaller organizations. Closer to home, we expect programs like Intuit's Quicken and Microsoft Money to have similar 3-D functions, whether provided by third parties as plug-ins or included in the base programs. Expect about a dozen 3-D-enabled business products to ship by the end of 1999.

Also increasing the importance of 3-D graphics to nongame computer users is Microsoft's Chromeffects, a new API that enables Web developers to access the 3-D capabilities in DX6. Implemented as new XML (eXtensible Markup Language)

EDITORS' CHOICE

- Business: Matrox Millennium G200
- Enthusiast: Creative Labs Graphics Blaster



For business use, 2-D performance, high-resolution support, and stability all rank above pure 3-D speed in the wish-list hierarchy.

That's why the Matrox Millennium G200 (\$130 street) garners our Editors' Choice in the mainstream business category. The Millennium's scores on our 2-D benchmark tests were solid. Its MGA-G200 chip doesn't offer the screaming 3-D acceleration of cards based on the hot nVidia RIVA TNT or the 3Dfx Voodoo Banshee, but its 3-D test results were respectably mid-pack, which means performance that is more than adequate for the coming spate of 3-D business apps.

Unlike so many other cards we tested, the Millennium proved a stable, trouble-free performer in our labs, and its DirectX 6.0 implementation was among the best we saw. The card also did the best on our Video Bandwidth Index test, which promises a clean video signal for high-resolution viewing. Matrox also offers a range of upgrades—TV tuner, DVD MPEG hardware decoder, video-editing package, and (most important) a Panel Link digital flat-panel connection—that let you customize

the card to fit your needs.

If you're a PC enthusiast looking for the best 3-D acceleration available in an integrated 2-D/3-D card, check out our Editors' Choice for the enthusiast, the Creative Labs Graphics Blaster Riva TNT (\$170 street) from Creative Labs. Its nVidia RIVA TNT chip lets it deliver top-tier 2-D and 3-D performance. Plus, Creative Labs adds stable, robust drivers and a host of useful utilities. In a field crowded with very similar accelerators, the full-featured and affordable Graphics Blaster showed the fewest problems in our labs.

Three other cards we tested are worthy of honorable mention. The TNT-based Diamond Viper V550 (\$200 street) edged past the Graphics Blaster on our tests and might be the right choice for gamers who want every iota of speed and are willing to pay a little extra for it. The Banshee-powered Guillemot Maxi Gamer Phoenix (\$110) and the Metabyte Wicked3D Vengeance (\$130 street) offer nearly the speed of the top finishers for less money.

tags contained in Web pages, Chromeffects adds 2-D and 3-D effects to Web pages, replacing bulky multimedia files with simple DirectX commands that download much more quickly. Expected to ship in early 1999, Chromeffects will most likely affect corporate intranets first, because it requires a 350-MHz Pentium II-based computer with a 100-MHz bus and 64MB of RAM.

WHICH IS RIGHT FOR YOU?

Before you buy a new accelerator, you'll need to know whether your system supports an AGP-based board. AGP

(accelerated graphics port), which was introduced by Intel in 1996, created a separate graphics port to assist the 3-D processing pipeline. Using AGP, the graphics chip is able to access system memory directly through the PC's own chip set at memory bus speeds, reducing latency and substantially increasing performance versus standard PCI memory transfers. Indeed, our 3D WinMark tests showed a 10 percent (or better) performance boost for AGP cards, compared with their PCI counterparts.

Business buyers should have an eye toward 3-D performance to protect their

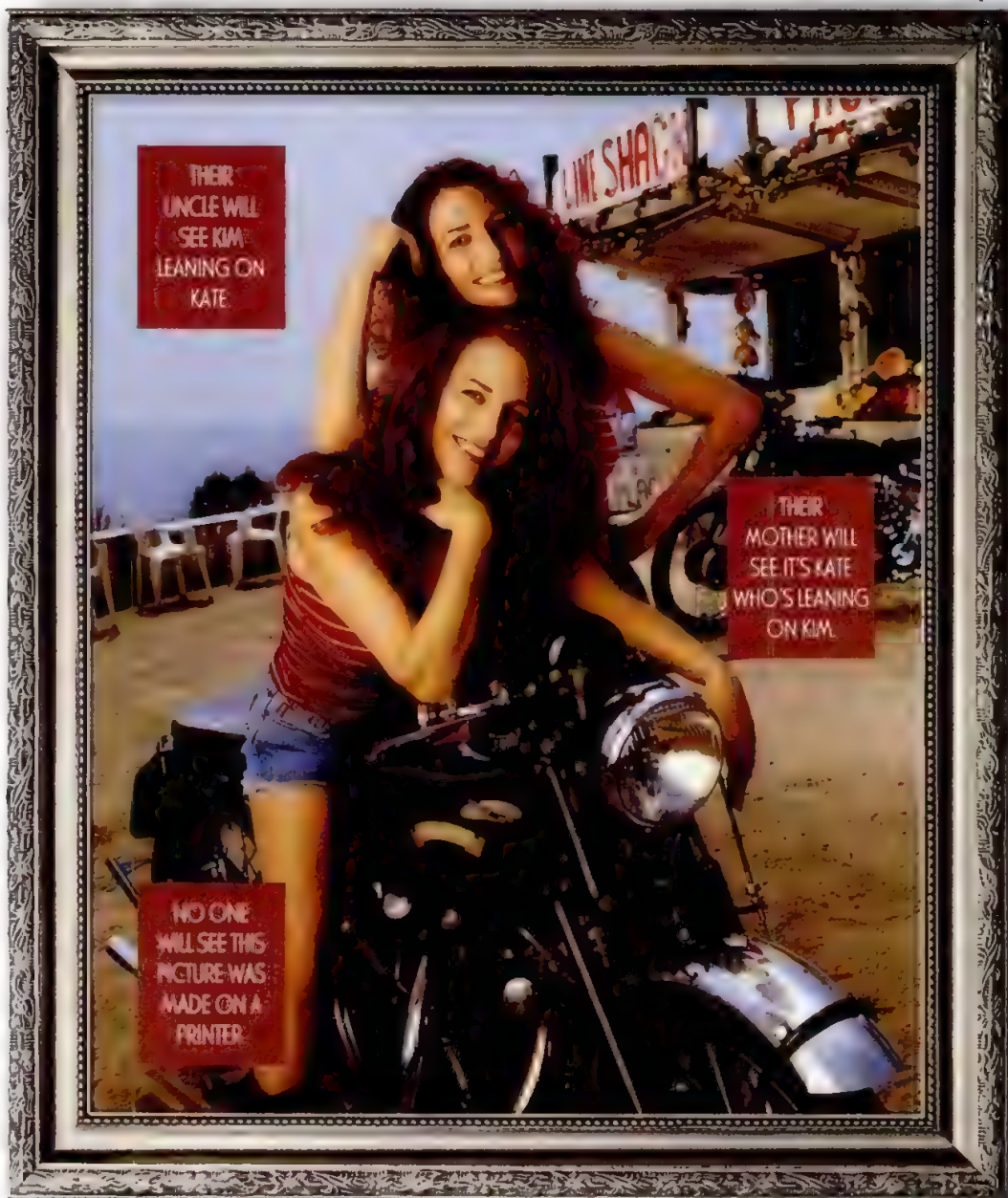
www.pcmag.com

There are more test results in the online version of "Who's the Fastest?" plus results for accelerators we purchased at retail. Do these cards perform the same as those submitted for review?

YOU'VE GOT TO SEE IT IN

EPSON

COLOR.



Our 6-color printing and 1440 dpi lets you see just how much this picture resembles an original photo. Actually it's an output from the amazing EPSON Stylus® Photo 700 ink jet printer. Everything it creates – from text to images – looks incredible. Even good enough to frame. It's all in the color and detail. Like the tiny beauty mark on Kate's left cheek. A small point, but one not overlooked by the twins' mother. Or this printer.

INTRODUCING THE WORLD'S ONLY 6-COLOR 1440 DPI PRINTER.

Only Epson® printers have the exclusive PerfectPicture™ Imaging System with: 6-color printing • 1440 x 720 dpi • Quick-drying inks • Fast color printing on any paper – snapshots in 90 seconds. Easy-to-use software bundle included. PC/Mac compatibility. One-year warranty with overnight exchange. For more information, call 1-800-GO-EPSON (ask for Oper.3064) or visit www.epson.com.



\$249

Epson Stylus Photo 700. Best for photo quality.

Price may vary. Epson and EPSON Stylus are registered trademarks of Seiko Epson Corp. PerfectPicture is a trademark of Epson America, Inc. ©1998 Epson America, Inc.

Choose 005 at www.pcmag.com/infolink

PERFORMANCE TESTS

Graphics Accelerators



On our 2-D tests, all of these cards performed acceptably for typical business use. In 3-D, the winners were based on the nVidia RIVA TNT and 3Dfx Voodoo Banshee chip sets. These third-generation 3-D engines consistently led the pack, speeding

past competition from Intel, Matrox, and S3.

We ran the latest versions of our staple benchmark test suites: ZD Business Winstone 99, ZD Business Graphics WinMark 99 (both for measuring 2-D graphics performance running business applications), and the newly revamped ZD 3D WinMark 99. This last suite has been redesigned to enhance the needs of contemporary 3-D applications and the evolving 3-D platform, making more use of the AGP bus and taking advantage of the more sophisticated Direct3D API included in Microsoft's DirectX 6.0. (For more detailed information on the latest Ziff-Davis bench-

mark tests, see p. 351 in this issue's Solutions section.)

Although we tested 29 different graphics cards, all are founded on only seven distinct chips, and performance fell roughly into 3 tiers: cards based on the nVidia RIVA TNT and 3Dfx Voodoo Banshee at the top, cards based on the Matrox MGA-G200 and S3 Savage3D in the middle, and cards based on the

Chromatic Mpac-2, Intel i740, and Number Nine Ticket to Ride IV at the bottom.

The TNT-based cards produced many of the best 3D WinMark scores. They were led by the Diamond Viper V550 AGP card, which scored 493 at 1,024-by-768 resolution with 16-bit color depth.

The card's excellent score was partially achieved on the strength of its clock settings (90 MHz for the chip and 112.5 MHz for the memory), which are slightly higher than those of other TNT-based cards, though still within nVidia's spec. The TNT-based cards also passed the highest number of 3-D quality tests.

▼ Cards built around the nVidia RIVA TNT or the 3Dfx Voodoo Banshee chip turned in the highest performance at 1,024-by-768 resolution with 16-bit texture colors. Of these, the Diamond Monster

Fusion (a Banshee card) and the Diamond Viper V550 (a TNT card) turned in the two fastest scores. Both are clocked slightly higher than other cards with the same chip set.

3-D PERFORMANCE TESTS

High scores are best.

Bold type denotes first place among reviewed products in each category.

Ⓜ denotes Editors' Choice.

AGP ACCELERATORS

BioStar Crux 390	S3 Savage3D (106 / 106)	Yes	354*
Canopus Spectra 2500	nVidia RIVA TNT (90 / 110)	Yes	440
Ⓜ Creative Graphics Blaster Riva TNT	nVidia RIVA TNT (90 / 110)	Yes	475
Diamond Monster Fusion	3Dfx Voodoo Banshee (110 / 125)	No	497
Diamond Viper V550	nVidia RIVA TNT (95 / 112.5)	Yes	493
ELSA Victory II	3Dfx Voodoo Banshee (100 / 115)	No	491
ELSA Erazor II	nVidia RIVA TNT (100 / 115)	Yes	487
Great Magic Mechspeed Raptor 740	Intel i740 (100 / 100)	Yes	222
Hercules Terminator Beast T9318SD	S3 Savage3D (100 / 100)	Yes	340*
Hercules Terminator Beast T9328SG	S3 Savage3D (100 / 120)	Yes	429*
Intel Express3D	Intel i740 (100 / 100)	Yes	222
Leadtek WinFast 3D S320	nVidia RIVA TNT (90 / 100)	Yes	439
Ⓜ Matrox Millennium G200	MGA-G200**	Yes	386
Matrox Marvel G200-TV	MGA-G200**	Yes	319
Metabyte Wicked3D Vengeance	3Dfx Voodoo Banshee (100 / 115)	No	442
Number Nine Savage Reality 357	S3 Savage3D (100 / 100)	Yes	340*
Number Nine Revolution IV 32MB	Ticket to Ride IV**	Yes	190
Prolink 3D Combo plus	Intel i740 (100 / 100)	Yes	222
Quantum3D Raven	3Dfx Voodoo Banshee (100 / 100)	No	363
Real3D StarFighter	Intel i740**	Yes	232
STB Nitro 3200	S3 Savage3D (100 / 100)	Yes	340*
STB Velocity 4400	nVidia RIVA TNT (90 / 110)	Yes	475

PCI ACCELERATORS

Diamond Monster Fusion	3Dfx Voodoo Banshee (110 / 125)	No	458
Diamond Viper V550	nVidia RIVA TNT (95 / 112.5)	No	460
Guillemot Maxi Gamer Phoenix	3Dfx Voodoo Banshee (100 / 115)	No	466
Proside Trinosaur PRS-MP6000	Mpac-2**	No	84
Real3D StarFighter	Intel i740**	No	209
STB Velocity 4400	nVidia RIVA TNT (90 / 110)	No	445
Quantum3D Obsidian II †	3Dfx Voodoo2 (92 / 92)	No	493

Chip set
(clock/memory frequency, in MHz)

AGP
textures

ZD 3D WinMark 99
1,024 x 768, 16-bit

1,280 x 1,024,
16-bit

1,024 x 768,
32-bit

BETTER ▶

* The Savage3D-based cards did not yet support triple buffering in DirectX 6.0 and were tested in single-buffer mode. Results are our estimates of triple-buffered performance, with a margin of error of ±10 percent. ** We were unable to measure the clock and memory speeds. † The Obsidian II is a 3-D-only card that needs to be used in conjunction with a 2-D card; we present its 3-D results for comparison. N/A—Not applicable. The accelerator did not support these test settings.

VISIO

Visualize your business™

...for one seat of AutoCAD, you can buy
12 of IntelliCAD: it must be worth a **TRY**.

The Architects Journal

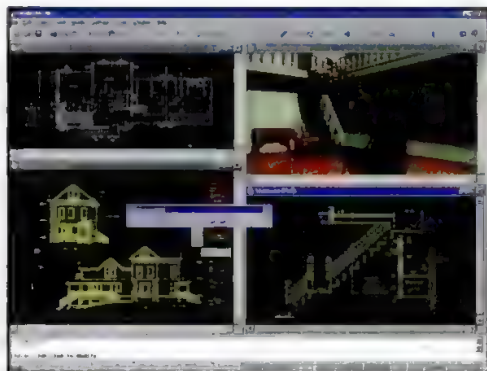
It's a tempting budget alternative that completely
OUTguns the underpowered and overpriced AutoCAD LT.

Personal Computer World

With a home user price and professional power,
IntelliCAD gives [the competition] a run for its money.

*PC Magazine**

When IntelliCAD® 98 by Visio was introduced in April, *Cadence* magazine wrote, "IntelliCAD represents a major victory for the CAD consumer by raising the bar of CAD software value." Since then, industry leaders have applauded the product's Autodesk AutoCAD compatibility, productivity features and affordability. Here's why. IntelliCAD 98 uses DWG as its native file format, just like AutoCAD. It can run in tandem with AutoCAD, and open AutoCAD files through version R14.01 without conversion or data loss. IntelliCAD 98 also provides support for AutoCAD commands, Autodesk AutoLISP programs, menus, dialogs and other legacy tools. Plus, it already runs over 100 AutoCAD applications from third-party developers, such as Eagle Point Software, Intergraph Corporation and Hitachi Software.



So don't confuse IntelliCAD 98 with a non-customizable, scaled-down version like Autodesk's AutoCAD LT. In fact, IntelliCAD 98 offers features not available in full-blown AutoCAD—like the ability to have multiple drawings open simultaneously, and cut and paste between them. There's also complete Microsoft ActiveX support for in-place editing within popular applications, such as Microsoft Word, Microsoft Excel and Visio® Technical. And just how affordable is

IntelliCAD 98? How's \$349 sound? Pick up a copy at your nearest retailer and discover for yourself what all the talk is about. For more information call 1-800-24-VISIO, reference A454. Or see it in action at www.visio.com/tryit.

**60
DAY****MONEY-BACK GUARANTEE**

*April 26, 1998 issue of PC World magazine. All rights reserved. Visio, the Visio logo, the visualize your business logo, and IntelliCAD are either trademarks or registered trademarks of Visio Corporation in the United States and/or other countries. All other trademarks, trade names, company names, etc. are used herein as used for identification only and are the property of their respective owners.

PERFORMANCE TESTS

2-D PERFORMANCE TESTS

High scores are best.

Bold type denotes first place within each category.

 denotes Editors' Choice.

AGP ACCELERATORS

BioStar CruX 390	S3 Savage3D (106 / 106)	32	20.6		18.0	122*	74*	74.9
Canopus Spectra 2500	nVidia RIVA TNT (90 / 110)	32	22.3		21.5	141	131	77.6
Creative Graphics Blaster Riva TNT	nVidia RIVA TNT (90 / 110)	32	22.3		21.6	143	135	92.9
Diamond Monster Fusion	3Dfx Voodoo Banshee (110 / 125)	24	22.8		21.4	161	136	86.7
Diamond Viper V550	nVidia RIVA TNT (95 / 112.5)	32	22.5		21.9	156	152	94.1
ELSA Victory II	3Dfx Voodoo Banshee (100 / 115)	24	22.0		21.6	138	138	83.9
ELSA Erazor II	nVidia RIVA TNT (100 / 115)	32	22.3		21.8	145	139	87.1
Great Magic Machspeed Raptor 740	Intel i740 (100 / 100)	24	20.9		N/A	81	N/A	85.9
Hercules Terminator Beast T9318SD	S3 Savage3D (100 / 100)	32	20.4		17.3	83*	67*	78.4
Hercules Terminator Beast T9328SG	S3 Savage3D (100 / 120)	32	21.0		19.0	98*	87*	N/A
Intel Express3D	Intel i740 (100 / 100)	24	20.8		N/A	81	N/A	84.3
Leadtek WinFast 3D 5320	nVidia RIVA TNT (90 / 100)	32	22.3		21.6	143	132	94.1
Matrox Millennium G200	MGA-G200**	24	22.0		21.5	129	129	93.7
Matrox Marvel G200-TV	MGA-G200**	24	22.1		21.1	122	121	94.9
Metabyte Wicked3D Vengeance	3Dfx Voodoo Banshee (100 / 115)	24	22.4		21.9	167	166	90.2
Number Nine Savage Reality 357	S3 Savage3D (100 / 100)	32	20.5		17.9	84*	73*	92.9
Number Nine Revolution IV 32MB	Ticket to Ride IV**	32	21.7		20.4	120	114	94.1
Preflink 3D Combo plus	Intel i740 (100 / 100)	24	20.9		N/A	81	N/A	80.8
Quantum3D Raven	3Dfx Voodoo Banshee (100 / 100)	24	22.3		21.4	136	136	83.1
Real3D StarFighter	Intel i740**	24	21.3		18.6	85	85	80.8
STB Nitro 3200	S3 Savage3D (100 / 100)	32	20.3		17.1	79*	63*	88.6
STB Velocity 4400	nVidia RIVA TNT (90 / 110)	32	22.6		20.9	149	146	80.8
PCI ACCELERATORS								
Diamond Monster Fusion	3Dfx Voodoo Banshee (110 / 125)	24	22.8		21.2	159	129	92.9
Diamond Viper V550	nVidia RIVA TNT (95 / 112.5)	32	22.4		21.9	155	152	94.9
Guillemot Maxi Gamer Phoenix	3Dfx Voodoo Banshee (100 / 115)	24	21.9		21.6	134	135	87.8
Proside Trinosaur PRS-MP6000	Mpact-2**	24	21.1		N/A	99	N/A	83.9
Real3D StarFighter	Intel i740**	24	20.9		18.0	75	43	81.4
STB Velocity 4400	nVidia RIVA TNT (90 / 110)	32	22.4		20.6	148	143	80.8

BETTER ►

* This unit disabled interrupts during testing; real-world performance may drop by 5 percent.

** We were unable to measure the clock and memory speeds. N/A - Not applicable. The accelerator did not support our test settings.

The Banshee-based cards were every bit as fast as the TNT-based cards in both 2-D and 3-D application testing. In fact, the very best 3D WinMark score was turned in by Diamond Multimedia's Banshee-based card, the Diamond Monster Fusion (AGP version). The Banshee cards, however, don't take advantage of AGP texturing and cannot render scenes in true-color mode. And again, even in the case of the Monster Fusion, the Diamond card's 3-D performance was aided by a higher-than-usual clock speed (110 MHz for the chip and 125 MHz for the memory).

S3 could not come through in time with a driver that engages triple buffering properly for its Savage3D chip. Using the early version of S3's reference driver, the Savage3D-based cards' performance under triple-buffer mode was more like double-buffer performance, which is typically slower. For the sake of this roundup, we could only estimate the Savage3D cards' triple-buffer performance, extrapolating from their scores under front-buffer mode.

Though the graphics hardware industry has made great strides in enhancing performance, what hasn't changed is vendors' eagerness to optimize their products for achieving higher benchmark scores in comparative reviews—typically at the expense of scene quality and possibly long-term product reliability. Throughout our testing project, we discovered much evidence of such ill-advised optimization. For instance, we found that Diamond's Monster Fusion driver, Intel's reference driver for i740 cards (Version 2.1), and STB's Velocity 4400 driver were all programmed to ignore rendering certain triangles smaller than a pixel in size and which crossed pixel centers. Such optimization may result in a higher frame rate, because the CPU is asked to perform fewer geometry calculations, but the performance enhancement comes at the cost of scene quality. For example, when an object comprising a high number of triangles

▲ Banshee and TNT cards were again in a league of their own on both Winstone and Business Graphics WinMark tests at 1,024-by-768 and 1,280-by-1,024 resolutions in true-color mode. Matrox's

MGA-G200-based cards also performed well in both resolutions. The Intel i740 and S3 Savage3D cards scored adequately at the lower resolution but dropped off significantly at the higher resolution.

moves farther away, the triangles in the object get smaller. If the graphics driver doesn't render those smallest triangles, parts of the object will eventually disappear—resulting in a fragmented object. This form of optimization seems to have been aimed at enhancing scores under last year's 3D WinMark 98, which did not include a Triangle Rasterization test to detect such behavior. We included such a test in the new 3D WinMark 99, found the offenders, and required them to submit drivers that did not drop such triangles.

Another tactic used to boost the 3D WinMark 98 score—but exposed by the new 3D WinMark 99—is frame skipping, which we noticed in the Real3D StarFighter. When playing 3-D scenes in front-buffer-only mode, as in 3D WinMark 98, the Real3D cards dropped 5 out of every 31 frames. This would have been hard to detect in 3D WinMark 98, but the new benchmark program displays the actual frame number on screen. We also found that nVidia's reference driver for the TNT forced the display of a lower-level MIP-map (using its auto-MIP-mapping feature) for the first 80 to 90 frames of the scene whenever Linear or Nearest filters (but not MIP-mapping) were invoked by the application. This resulted in a blurry image for the first second of playback for a potentially small gain in performance on the old benchmark tests.

It also seems to be common practice for graphics hardware



It's the newest generation of graphics technology. And a whole new standard for speed.

Prepare to behold the new standard in PC graphics performance. The new ATI RAGE 128 technology. Furiously fast. Fabulously flexible. Profoundly new and exciting. From the worldwide leader in PC graphics.

Its heart is in the new ATI RAGE 128 next-generation 3D accelerator, the revolutionary new graphics chip that delivers the fastest performance, no matter what the medium—3D, 2D or video. It combines a true 128-bit engine and up to 32MB of memory with a new SuperScalar Rendering, Twin-Cache Architecture and

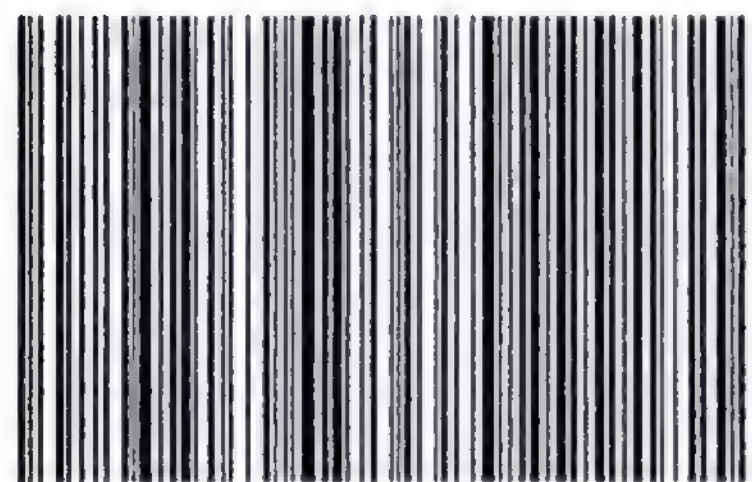


Single-Pass Multi-Texturing technologies for blistering 3D performance and highly detailed display of advanced texturing, lighting and shading effects. And it delivers exquisite DVD video from built-in DVD/MPEG-2 decoding. There's the ATI RAGE 128 GL controller for PC workstations and high-end entertainment PCs. And the ATI RAGE 128 VR controller for stunning performance like you've never seen on a home or business machine. Look for new ATI RAGE 128 technology in the newest system from the world's top PC makers, and in the new ATI RAGE 128 graphics workstations available at computer retailers everywhere.

True 128-Bit Graphics Acceleration • Up To 32MB • SuperScalar Rendering • Integrated DVD



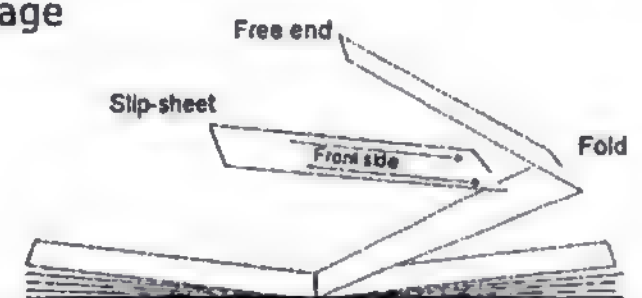
Inverted Foldout slip-sheet



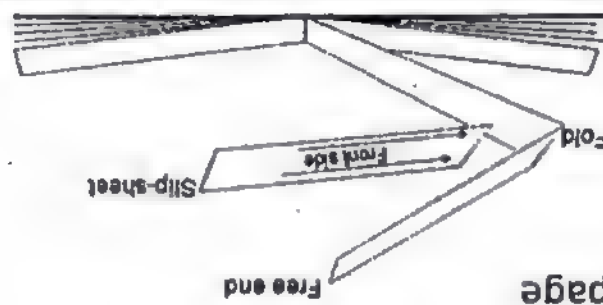
GbsSlipSheet-001

Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

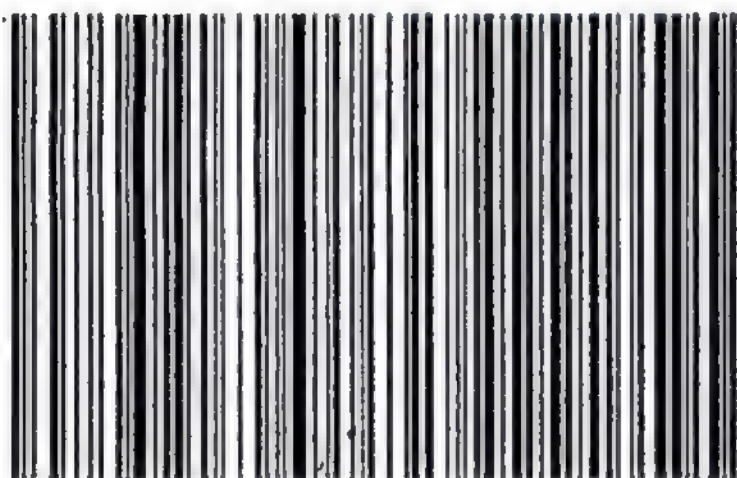


1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



GbsSlpBack-0018

Back

1. Follow instructions on the other side



ATI RAGE FURY

The 32MB Ultimate Game Card

We know playing games is serious business, and this is one serious gamer card. With 32MB of memory on-board. More advanced 3D and 2D features built-in. More speed, more performance, more realism and heart-pounding excitement than you ever thought possible. The new ATI RAGE FURY delivers better-looking, more compatible gaming performance than cards costing hundreds more.

- A new 128-bit graphics engine and 128-bit memory interface for incredibly fast 3D and 2D graphics performance
- 32MB of memory for realistic gameplay with massive textures and high resolution
- Full OpenGL 1.0, Direct 3D and DirectX 6.0 support for all your favorite 3D applications and games
- Advanced 3D features including line and edge anti-aliasing, double buffering, gouraud shading and multi-texturing
- Full 3D acceleration in all modes, all color depths, and all resolutions up to 1920x1200
- Built-in hardware DVD for full-frame, full-screen DVD playback
- TV-Out for big-screen gaming



ATI XPERT 128

The Price/Performance Powerhouse

ATI brings striking graphics performance to home, small office and home-based business PCs. With 16MB of memory on-board, AGP 2X graphics, brilliant 2D acceleration and a massive list of superior 3D performance features and visual enhancements, the ATI XPERT 128 is in a class all by itself. In fact, it's the best all-round graphics upgrade you can buy today.

- A 128-bit graphics engine and 128-bit memory interface for super-fast 3D and 2D graphics performance
- 16MB of memory radically improves speed and appearance
- Full support for Direct 3D and OpenGL for all your favorite graphics-intensive 3D games and applications
- Advanced 3D features including line and edge anti-aliasing, double buffering, gouraud shading, multi-texturing and bilinear/trilinear filtering
- Full 3D acceleration in all modes, all color depths, and all resolutions up to 1600x1200
- Full-frame, full-screen MPEG-2/DVD playback without the need for additional hardware



ATI RAGE MAGNUM

Professional Power Plus

It's a whole new generation of hyper-performance PC graphics accelerator for NT workstations. With blinding speed, extensive in-hardware features and much more bang for the buck than ever. The new ATI RAGE MAGNUM delivers smoother animation and richer, faster, more accurate content design.

- 128-bit graphics engine with advanced triangle setup and 128-bit memory interface for ultra-fast true-color, 3D and 2D graphics in high resolutions
- 32MB of memory to handle massive graphics textures at high resolutions and provide full support for 32-bit hardware Z with OpenGL
- Fully featured OpenGL 1.0 optimized to provide superlative performance for professional graphics, 3D animation, CAD/CAM and visualization
- Advanced graphics architecture with SuperScalar Rendering, line and edge anti-aliasing, gouraud shading, Twin-Cache, Single-Pass Multi-Texturing and bump mapping
- Full 3D acceleration in all modes, all color depths, and all resolutions up to 1920x1200
- Built-in hardware DVD for full-frame, full-screen DVD playback

For complete specs and the amazing performance numbers, go to www.atitech.com.



The New Breed of Speed.





ATI RAGE 128 Is Born.
Graphics Scream.

PERFORMANCE TESTS

companies to try to gain a performance edge through clock-speed manipulation. Typically, there are explicitly specified optimal clock-speed settings for accelerator chips and memory. We obtained clock-speed-reporting utilities from nVidia, S3, and 3Dfx to ascertain clock settings on all cards based on those companies' chips. We found that Diamond Multimedia pushed its cards' clock speeds consistently higher than other vendors using the same chips. ELSA also pushed the clock beyond nVidia's recommendation; its Erazor II's TNT chip was revved to a sizzling 100 MHz, and the memory was clocked higher than those of all other TNT cards—at 115 MHz. Though Diamond and ELSA both offer generous warranties, there is always a risk of burning out the components prematurely. For this reason, by the time you read this we will have purchased samples of all the cards in this roundup that showed possibly excessive clock speeds—to verify if the vendors are continuing to ship their cards at the same speed. We'll report the results with the on-line version of this story at www.pcmag.com.

In addition to our standard benchmark tests, we also ran each card through a new signal quality test as a response to the growing trend toward bigger monitors. With larger screens now coming to consumer desktops, higher display resolutions are becoming more commonplace—and that calls for a higher standard in the quality of display signals generated by graphics adapters. Our Video Bandwidth Index indicates what percentage of full signal intensity a card can generate when illuminating literally every other pixel in the horizontal direction. An index of 100 percent means the high-frequency signals are reaching their full voltage. On our test, the two Matrox cards, the TNT-based card from Diamond, the Leadtek WinFast 3D S320, and the Number Nine Revolution IV demonstrated excellent high-frequency response.

investment in hardware for the next year and a half, but should be more focused on our 2-D Business Winstone scores, which predict performance for the applications they use most. Although all boards here are more than adequate for word processing and spreadsheet functions, boards with higher Winstone scores will push through more complex tasks such as image and video editing perceptibly faster.

If you don't think you'll be using the new 3-D applications anytime soon, you might consider trading off 3-D performance for price. For example, the Matrox Millennium G200 and most of the Savage3D-based cards cost about \$50 less than most TNT- or Voodoo-based boards but nearly match their Winstone scores. For truly value-conscious business and consumer users, the Intel i740-based boards represent an incredible opportunity to upgrade your graphics. Though these boards aren't the best choices for heavy 3-D game play, in basic

2-D functions their slower speed (compared with the leaders) would be imperceptible to most users. And you can buy an Intel i740-based board for less than \$100 (street).

As for memory, 8MB of RAM is adequate for 2-D applications, though Chromeffects and the business-oriented 3-D applications discussed above may push you toward 16MB, especially since the price delta is only about \$40.

Fast-twitch gamers will want to focus on 3-D-rendering performance. The cream of the current crop are the RIVA TNT and Voodoo Banshee chips (though ATI and 3Dlabs have new chips that might change that). If you happen to have an investment in games written to 3Dfx's proprietary GLide API, that might tip the balance toward the Banshee. In terms of on-board memory, you'll get the best results with texture-intensive games with 16MB, and you can run in higher resolutions and color depths. Considering the small price

How We Tested

We tested the graphics cards in a Dell Dimension XPS R400 with a 400-MHz Pentium II processor, 512K of L2 cache, 128MB of RAM, and an EIDE hard disk loaded with Windows 98. For subjective evaluation, we used as a test-bed an NEC Direction SLP 300 running Windows 98 with a 300-MHz Pentium II processor, 512K of L2 cache, 64MB of RAM, and an EIDE hard disk. The NEC C700 monitor was set to a non-interlaced 85-Hz vertical refresh rate.

The score generated by 3D WinMark 99 is a measure of a graphics card's general 3-D performance. The test suite indicates how fast a graphics subsystem can display a series of game-like scenes using Microsoft Direct3D APIs. We set the page flipping to triple buffer, if supported by the graphics subsystem. If not supported, we tested the card at double-buffer mode.

We used the ZD Business Graphics WinMark 99 suite to isolate and compare graphics subsystem performances in 2-D graphics. WinMark 99 implements Ziff-Davis's proprietary graphics-playback technology to model the graphics subsystem's performance in executing the same graphics activities invoked by Winstone applications. The ZD Business Winstone 99 test suite gauges a system's performance in running real-world business applications, employing nine top-selling Windows programs. The Video Bandwidth Index is an intensity ratio of high-frequency vertical lines to horizontal lines. The number, which is generated by running a test in Sonera Technologies' DisplayMate (800-932-6323, www.displaymate.com) is a good indicator of the ability of a graphics card's analog circuitry to raise and lower the signal amplitude quickly to an accurate level.—*Analysis written by S. Jae Yang.*

Special thanks to Jess Diard, Eric Hale, Dave Morey, Grady Ormond, and Bo Wilson of Ziff-Davis Benchmark Operation, and to Ray Soneira of Soneira Technologies.

increment, 16MB is a no-brainer.

If your monitor is relatively small but you own a large-screen television, TV-out is a great feature. Voodoo2 owners planning to keep their 3-D-only cards should make sure their new boards are Voodoo2-compatible and check for Voodoo2-compatibility enhancements such as Canopus' reverse graphics pass-through connector.

Bundled software is always important, but beware of *shovelware*, old or limited-use software that adds little or no value to the package. Finally, if games are a primary but not exclusive avocation, consider the availability of other features such as hardware or software DVD playback, TV tuning, or video capture. The new generation of chips (and the accelerators that use them) certainly raises the bar on performance while delivering more bang for the buck than ever before. The reviews that follow will help you pick which particular card is right for your money.



MIND-BLOWING 128-BIT

INTRODUCING THE RIVA TNT 3D PROCESSOR.



Hold onto your armrests...you're not going to believe your eyes. The new RIVA TNT graphics processor delivers the most stunning, realistic graphics ever seen on a personal computer screen.

The RIVA TNT's 32-bit color Twin Texel pipeline with support for 16 Megabytes of frame buffer dares 3D applications to run at an unheard of 1600x1200 resolution. RIVA TNT also delivers explosive 2D for your business applications, like Photoshop.

The RIVA TNT is the first 3D processor to provide hardware support for Microsoft's new DX6 API, as well as full OpenGL support for professional applications on the Windows platform of your choice. And it's available only from the best graphics card suppliers in the world such as Diamond, STB, Creative Labs and Elsa.

Whether you are running one of the many new graphics-rich business applications, or playing the hottest new games, the RIVA TNT will blow you away. But don't just take our word for it. Head to our website at www.nvidia.com and we'll link you to those who have experienced the RIVA TNT firsthand. Then brace yourself; 'cuz this baby will blow the 3D market sky high.

©Copyright 1998 NVIDIA Corporation. NVIDIA, the NVIDIA logo, RIVA TNT and Bringing 3D to the World are trademarks of NVIDIA Corporation. All other names are registered trademarks of their respective companies. All rights reserved.

GRAPHICS.



nVIDIA.

BRINGING 3D TO THE WORLD™

Choose 046 at www.pcmag.com/intolink

BioStar Crux 390

S3 Savage3D chip; 8MB memory; 1,600 x 1,200 resolution (85 Hz refresh). AGP, \$129 list. Fremont, CA; 510-226-6678; www.biostar-usa.com; 550 at www.pcmag.com/infolink.

● The BioStar Crux 390 is a work in progress. It has all the basics needed to handle day-to-day computing, but lacks the performance and advanced features to cope with more demanding applications or serious gaming.

Installing the Crux 390 under Windows is simple enough: Just load the supplied CD-ROM and follow the auto-run prompts. This simplicity is a good thing; the only technical support contacts listed are the Web page and the home office in Taiwan, because the company is just entering the U.S. market. The driver

offers a multimedia button that lets you play MPEG, DAT, and QuickTime files with a click of the mouse. There aren't any provisions for a TV tuner or DVD daughtercard, but the software bundle includes Cyberlink's software-based MPEG decoder for DVD playback.

The Crux 390 was an average performer on our 2-D and 3-D benchmark tests. In scene-quality evaluation, the board looked fine when running basic 2-D applications, but we noted artifacts when scrolling a large image in Adobe Photoshop—probably the fault of an underdone driver. Playing the 3-D game Incoming was a special challenge. The radar screen lost its grid, the weapons didn't have visible muzzle flashes when fired, and the tar-

get identification markings were absent. You can do better with the less expensive Number Nine Savage Reality 357 or the similarly priced cards from Diamond and Hercules.—James Karney

Canopus Spectra 2500

nVidia RIVA TNT; 16MB; 1,920 x 1,440 (75 Hz). AGP, \$200 street. San Jose, CA; 888-868-2533; www.canopuscorp.com; 551 at www.pcmag.com/infolink.

● The Canopus Spectra 2500 is a fast, stable performer and an excellent choice for power users or gamers with AGP systems. Unlike most other RIVA TNT boards, the Spectra doesn't include any games, though its utilities are very useful. The unique Application Launcher, for example, automatically switches to your preferred resolu-

APPIAN DUET DOUBLE VISION

Stock traders have long known the benefit of running several monitors from one PC: more application windows and information available at a glance. And now Microsoft Windows 98, with its native dual-monitor support, is raising awareness about this option in the general business arena.

The rationale is simple: Instead of trading up to progressively larger, more expensive monitors, you can add a second monitor and double your screen real estate. Such a solution is ideal for CAD/CAE designers, image and video editors, Web authors, and desktop publishers, because they can have their projects open on one screen and all their tool palettes on the other. General business users can have their productivity applications open on their main screens, and their e-mail or Web browser visible on the others. Or they can resize a single document (such as a really large spreadsheet) to fill both monitors.

Enter Appian Graphics (800-727-7426, www.appiangraphics.com), the leader in dual-monitor graphics solutions. Its Duet accelerator (AGP or PCI, \$390 street), based on the S3 ViRGE/MX chip set, can spread a single screen image across two monitors, provide a wide view of an application on one screen while zooming in on the second, or show a different application in each monitor simultaneously. The drivers support all functions under Windows 95, 98, and NT 4.0, and Appian expects to support Windows NT 5.0 when it ships.

Both the AGP and PCI versions of the Duet are single-slot plug-and-play solutions, and we had no difficulty getting each to run under Windows 98 and Windows NT Server 4.0. Installation is straightforward: The card initially boots to the first monitor, then asks you to load the HydraVision control utility from a floppy disk. After a reboot, the second monitor is then configured. The driver positions dialog boxes intelli-

gently to avoid splitting them between monitors, runs different resolutions on each screen, maximizes a window to one monitor or across both with a single click, and sets hotkeys for zooms, pop-up windows, and more.

To put the Duet through its paces, we opened an image in Adobe Photoshop. Then we used one monitor to enlarge the picture and show individual pixels while we worked on the full view in the other. With only a few mouse clicks, we switched to a Microsoft Word document on one monitor while viewing a full-screen Web browser in the second. We had no problem dragging and dropping a text selection from the Web page on one screen to the open document in the other. We did notice a slight lag in closing Windows, perhaps due to the inherent performance drag from running two monitors through a single bus. In any case, the delay wasn't annoying, and we enjoyed having the ability to scroll a mouse from one screen to another.

For users who need more performance, Appian will release AGP and PCI versions of its souped-up Jeronimo Pro card this fall. The Jeronimo Pro has twin 3DLabs Permedia P2 controllers and comes in three versions: 2MB (\$640 street), 4MB (\$790) and 16MB (\$990). Each is bundled with the same HydraVision software as the Duet. We examined an early 16MB PCI edition in our labs and noticed a definite boost in speed over the Duet. The only drawback for some users will be the loss of the TV-out port—a useful feature for many business presentations.

By today's standards, the Duet and Jeronimo may seem a bit pricey. But when you consider the cost of a single 21-inch monitor (around \$1,000) compared with two 15-inch ones (around \$250 apiece), or the sheer allure of having double desktops, you'll likely agree that these cards offer real value for their intended markets.—JK



Nokia 446Xs



OUR ENGINEERS WERE GOING FOR A LINE-OF-SIGHT 35° BELOW EYE LEVEL.



OUR DESIGNERS WERE GOING FOR *swoopy*.

Despite their differences, vocabulary being the most obvious, the engineers and designers at Nokia are all focused on the same thing. Namely, to build the world's best monitors.

It's this unique collaboration that makes every Nokia a marvel of technology and ergonomics, as well as contemporary Finnish design.

The Nokia 446Xs is a perfect example. This sleek 19" monitor (17.8" VIS) delivers up to 1600 x 1200 resolution, up to 90Hz refresh rate at 1280 x 1024, with a .22mm horizontal dot pitch. It's a short neck CRT for a smaller footprint, but it saves considerably more than desk space.

Research shows that traditional viewing angles require your eyelids to be more open, allowing moisture to evaporate, causing dry eye and fatigue. We corrected this problem by designing the Nokia 446Xs with a lower base, allowing for an optimum viewing angle of 35° (similar to the angle at which you're reading this magazine). The monitor's lower profile helps users experience less fatigue, not only in their eyes, but also in their neck and back.

It's a monitor of optimum ergonomics. With radically hip overtones, of course. For more details, call 1-800-BY NOKIA, or visit us at www.nokia.com/americas.

NOKIA
CONNECTING PEOPLE

BUY YOUR PC FROM
DELL, GATEWAY, OR APPLE.
BUY YOUR PRINTER
DIRECT FROM GCC.



HERE'S WHY...



We're GCC Technologies and our printers are sold direct against some of the most famous names in the computer industry. Which creates a buying opportunity for those who understand a basic principle of free enterprise: Selling direct is better for the manufacturer and buying direct is better for the customer.

Therefore, we sell our printers direct, eliminating many prosperous middlemen, and lowering your costs.

We also provide direct technical support, eliminating other middlemen who can't solve your problems. And we are compassionate hand-holders. We offer unlimited free technical support, not just on business days, but on Saturdays too – throughout the one-year warranty period. And if during that period you have a problem that our technical support people can't solve, our Platinum Exchange program guarantees you a replacement printer by the next business day.

We invite you to buy your next printer direct from GCC and join our growing family of satisfied customers. All GCC printers come with an unconditional thirty-day money-back guarantee.

For complete details, call the 800 number below. And for the record, yes, our printers have wonderful technology too. It's just that you don't have to pay extra for it.



ELITE 12 Series

12 pages per minute
1 year Platinum Exchange Warranty
Maximum Print Area 8.5" x 14"
Letter, legal, A4, envelope
250 sheet Universal Tray
PostScript® Level 2 compatible, PCL 5
80 PostScript fonts, 15 PCL fonts
RAM expandable to 64 MB
EtherTalk®, LocalTalk®, TCP/IP
Ethernet (10BaseT), Bi-directional Parallel

2nd Paper Feeder*
(Includes 500 sheet Universal Tray) Add \$299

Extra 8 MB Memory Add \$ 49

\$999 **600 dpi**

Business Lease \$35 Month/36 months
Platinum Exchange Warranty Program
Additional Year Add \$ 99

\$1199 **1200 dpi**

Business Lease \$41 Month/36 months
Platinum Exchange Warranty Program
Additional Year Add \$ 119

ELITE XL 20 Series

20 pages per minute
1 year Platinum Exchange Warranty
Maximum Print Area 12.75" x 35.25"
Ledger, letter, legal, A3, A4, envelope, poster
500 sheet Universal Tray
PostScript® Level 2 compatible, PCL 5
285 PostScript fonts, 15 PCL fonts
RAM expandable to 64 MB
EtherTalk®, LocalTalk®, NetWare™, TCP/IP
Ethernet (10BaseT, AAUI), Bi-directional Parallel

2nd or 3rd Paper Feeder*
(Includes 500 sheet Universal Tray) Add \$299

Extra 8 MB Memory Add \$ 49

\$1799 **600 dpi**

Business Lease \$63 Month/36 months
Platinum Exchange Warranty Program
Additional Year Add \$ 179

\$1999 **800 dpi**

Business Lease \$70 Month/36 months
Platinum Exchange Warranty Program
Additional Year Add \$ 199

\$2199 **1200 dpi**

Business Lease \$75 Month/36 months
Platinum Exchange Warranty Program
Additional Year Add \$ 219

ELITE XL 8 Series

8 pages per minute
1 year Platinum Exchange Warranty
Maximum Print Area 11" x 17"
Ledger, letter, legal, A3, A4, envelope
250 sheet Universal Tray
PostScript® Level 2 compatible, PCL 5
80 PostScript fonts, 15 PCL fonts
RAM expandable to 64 MB
EtherTalk®, LocalTalk®, TCP/IP
Ethernet (10BaseT, 10Base2), Parallel

2nd Paper Feeder*
(Includes 250 sheet Universal Tray) Add \$319
(Includes 500 sheet Universal Tray) Add \$419

Extra 8 MB Memory Add \$ 49

\$1399 **600 dpi**

Business Lease \$48 Month/36 months
Platinum Exchange Warranty Program
Additional Year Add \$ 139

* The Elite 12/600, Elite 1212, and the Elite XL 608LC support one additional paper feeder. The Elite XL 20/600, Elite XL 20/800, and the Elite XL 20/1200 support two additional trays.

GCC Technologies is a registered trademark of GCC Technologies, Inc. Elite 12/600, Elite 1212, Elite XL 608 LC, Elite XL 20/600, Elite XL 20/800 and the Elite XL 20/1200 are trademarks of GCC Technologies, Inc. All other trademarks or registered trademarks are trademarks of their respective companies.

Keycode 812PMS1

Choose 017 at www.pcmag.com/infolink

To order call 1-800-422-7777, or visit our web site, www.gccotech.com



3Dfx

The Ultimate 3D PC Entertainment Experience

Best Hardware. Best Software.

3Dfx Interactive offers the broadest set of performance 3D solutions on the market. From the pure 3D power of Voodoo² to the breakthrough 2D/3D capabilities of Voodoo Banshee[™], 3Dfx Interactive offers more speed, performance and compatibility than any other company.

That is why 3Dfx is the accelerator of choice for top publishers like Electronic Arts and Activision and top computer manufacturers including Gateway, Compaq, Micron and Packard Bell.

This fall the hottest 3D PC games including Madden NFL[™] 99 by Electronic Arts, Quake[™] II by id software and Half-Life[™] by Sierra are available for 3Dfx's Voodoo Technology. With support for Microsoft's Direct 3D, OpenGL[™] and 3Dfx's proprietary API GLIDE[™], 3Dfx Interactive's Voodoo Technology is already compatible with over 500 products currently on the market and that is just the beginning.

Look for the 3Dfx logo on leading 3D accelerators and computers to ensure you get all the power and compatibility that only 3Dfx can offer.



www.3dfx.com

Choose 077 at www.pcmag.com/infolink

SUMMARY OF FEATURES

Graphics Accelerators

AGP mode supported AGP 1X runs at 66 MHz, with a maximum burst data-transfer rate of 264 MBps. AGP 2X runs at 133 MHz and raises the burst rate to 528 MBps. AGP 2X also includes command pipelining and sideband addressing, which allow for better bus utilization.

Memory type SDRAM (or Synchronous DRAM) is the most common type of memory found on graphics cards. Many newer cards use SGRAM (Synchronous Graphics RAM), which is similar to SDRAM but includes graphics features specially enhanced for use with display adapters.

Digital flat-panel connector An increasing number of flat-panel LCD monitors support an all-digital display signal, but most graphics cards don't yet have the connector that this requires.

OpenGL-Installable Client Driver available To run applications designed for the high-end OpenGL graphics API, a graphics card must include its own OpenGL-enabled driver.

24-bit z-buffer/32-bit z-buffer Z-buffering stores the z (or depth) value of each pixel and then compares it with other pixels in the same area of the screen. The greater the bit depth, the more precise the indication of depth in 3-D space; 24-bit z-buffering provides 24 distinct levels of depth for each pixel, where 32-bit z-buffering provides 32.

Edge anti-aliasing This feature smooths the edges of triangles by calculating lines between vertices.

Per-pixel anti-aliasing This smoothing technique (also known as *sort-independent* or *scene anti-aliasing*) artificially expands the resolution of a scene in the frame buffer memory, performs an averaging operation, and then resamples to the correct resolution. The result: a smoother image.

Trilinear MIP mapping In 3-D space, textures are applied to surfaces using tiny bitmapped files. Trilinear MIP mapping adjusts the level of detail visible in each textured surface, depending on that surface's distance from the viewer.

Anisotropic filtering This filtering technique improves the rendering of textures at an angle to the viewer.

Bump mapping To bring textured surfaces into relief, bump mapping changes their colors and shadows, depending on the intensity and direction of the light hitting the surface. —Josh Levy

■ YES ☐ NO □ OPTIONAL

Products listed in review order

Street price, PCI version/AGP version

AGP mode supported
Graphics accelerator chip

RAMDAC speed

Tested display memory/Maximum memory
Memory type

VGA pass-through connector

TV tuner

DVD MPEG-2 decoder

Other add-on options

Maximum noninterlaced graphics resolution

Maximum refresh rate at that resolution

Maximum 3-D resolution supported

Maximum number of colors at:

1,600 x 1,200 resolution

1,280 x 1,024 resolution

DVD MPEG-2 software decoder

DVD motion compensation in hardware

Digital flat-panel connector

Supports double-wide display/
16:9 aspect ratio

TV-out

Drivers available for Windows 3.x / 95 / 98

Drivers available for Win NT 3.5 / 4.0 / OS/2

Supports hardware zoom (highest zoom factor)

Fully DirectX 6.0-compatible

OpenGL Installable Client Drivers available

Drivers available for AutoCAD/
Microstation/Heidi

24-bit z-buffer/32-bit z-buffer

Texture memory/Frame-buffer memory

Triangle setup engine

Edge anti-aliasing/Per-pixel anti-aliasing

Trilinear MIP mapping/Perspective correction

Anisotropic filtering/Paletted textures

MPEG video textures/Bump mapping

Warranty

Toll-free technical support

Technical-support hours (eastern time)

Web site

BioStar CruX
390

Canopus
Spectra 2500

Creative Labs
Graphics
Blaster Riva
TNT

Diamond
Monster
Fusion

Diamond Viper
V550

2X with sideband
S3 Savage3D

250 MHz

8MB / 8MB

SDRAM,
SGRAM

■

■

■

■

None

1,600 x 1,200

85 Hz

1,152 x 864

65,000

16.7 million

CyberLink

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

2X with sideband
nVidia RIVA TNT

250 MHz

16MB / 16MB

SDRAM

■

■

■

■

Video editing
(\$100)

1,920 x 1,440

70 Hz

1,600 x 1,200

16.7 million

16.7 million

None

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

2X with sideband
nVidia RIVA TNT

250 MHz

16MB / 16MB

SDRAM

■

■

■

■

None

1,920 x 1,200

75 Hz

1,600 x 1,200

16.7 million

16.7 million

None

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

1X
3Dfx Voodoo
Banshee

250 MHz

16MB / 16MB

SDRAM (PCI),
SGRAM (AGP)

■

■

■

■

None

1,920 x 1,440

60 Hz

1,600 x 1,200

16.7 million

16.7 million

None

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

■

2X with sideband
nVidia RIVA TNT

250 MHz

16MB / 16MB

SDRAM

■

■

■

■

None

1,920



ELSA Victory II	ELSA Erazor II	Great Magic Machspeed Raptor 740	Guillemot Maxi Gamer Phoenix	Hercules Terminator Beast T9318SD	Hercules Terminator Beast T9328SG	Intel Express3D	Leadtek WinFast 3D S320	Matrox Millennium G200	Matrox Marvel G200-TV	Metabyte Wicked3D Vengeance
N/A / \$150	\$170 / \$170	N/A / \$45	\$150 / Info not available	N/A / \$110	N/A / \$130	N/A / \$75	N/A / \$180	\$130 / \$130	\$300 / \$300	\$130 / \$130
1X 3Dfx Voodoo Banshee	2X with sideband nVidia RIVA TNT	2X with sideband Intel i740	1X 3Dfx Voodoo Banshee	2X with sideband S3 Savage3D	2X with sideband S3 Savage3D	2X with sideband Intel i740	2X with sideband nVidia RIVA TNT	2X with sideband MGA-G200	2X with sideband MGA-G200	1X 3Dfx Voodoo Banshee
250 MHz	250 MHz	220 MHz	100 MHz	250 MHz	250 MHz	203 MHz	250 MHz	250 MHz	230 MHz	250 MHz
16MB / 16MB SGRAM	16MB / 16MB SGRAM	8MB / 8MB SDRAM	16MB / 16MB SGRAM	8MB / 8MB SGRAM	8MB / 8MB SDRAM	8MB / 8MB SDRAM	16MB / 16MB SDRAM	8MB / 16MB SGRAM	8MB / 16MB SDRAM	16MB / 16MB SDRAM
None	None	None	None	None	None	None	None	□ (\$149) □ (\$79) Video editing (\$80)	None	3-D goggles (\$130)
1,600 x 1,200 85 Hz 1,600 x 1,200	1,920 x 1,200 85 Hz 1,600 x 1,200	1,600 x 1,200 75 Hz 1,024 x 768	1,900 x 1,440 80 Hz 1,600 x 1,200	1,600 x 1,200 85 Hz 1,024 x 768	1,600 x 1,200 85 Hz 1,024 x 768	1,600 x 1,200 75 Hz 1,280 x 1,024	1,920 x 1,200 60 Hz 1,920 x 1,200	1,920 x 1,200 76 Hz 1,600 x 1,200	1,920 x 1,200 70 Hz 1,600 x 1,200	2,000 x 1,500 69 Hz 1,920 x 1,440
16.7 million 16.7 million None	16.7 million 16.7 million None	256 65,000 Xing	16.7 million 16.7 million None	65,000 16.7 million None	65,000 16.7 million None	256 65,000 None	16.7 million 16.7 million CyberLink	16.7 million 16.7 million None	16.7 million 16.7 million None	16.7 million 16.7 million None
Win 95, 98, NT	Win 95, 98, NT	Win 95, 98, NT	Win 95, 98, NT	Win 95, 98, NT	Win 95, 98, NT	Win 95	Win 95, 98, NT	Win 95, 98, NT	Win 95, 98, NT	None
6 years	6 years	5 years	3 years	5 years	5 years	5 years	3 years	3 years	3 years	5 years
5:00-2:00 M-F	5:00-2:00 M-F	Noon-9:00 M-F	8:00-7:00 M-F	9:00-9:00 M-F	9:00-9:00 M-F	11:00-8:00 M-F	6:00-3:00 M-F	9:00-5:00 M-F	9:00-5:00 M-F	11:00-8:00 M-F
www.elsa.com	www.elsa.com	www.machspeed.com	www.guillemot.com	www.hercules.com	www.hercules.com	www.intel.com/graphics	www.leadtek.com	www.matrox.com/mga	www.matrox.com/mga	www.wicked3d.com www.metabyte.com

Creative Labs Graphics Blaster Riva TNT

nVidia RIVA TNT; 16MB; 1,920 x 1,200 (75 Hz). AGP or PCI, \$170 street. Milpitas, CA; 800-998-5227, 408-428-6600; www.creative.com; 552 at www.pcmag.com/infolink.

- The Graphics Blaster Riva TNT will warm the hearts of both general business

users and gamers. Its 2-D and 3-D benchmark test scores put it in the top tier of graphics accelerators, and it should win favor for its reasonable software bundle and simple, well-integrated installation procedure. It's our Editors' Choice for 3-D enthusiasts.

The Graphics Blaster comes with

Creative Labs SoftMPEG MPEG-1 player and Forsaken, a D3D game. But two bundled utilities from Sonnetech stand out: Colorific is a monitor-calibration utility that you can use to match screen colors with printer output, and 3Deep is a 3-D-specific utility that automatically adjusts your



SUMMARY OF FEATURES

See www.pcmag.com for interactive views

Graphics Accelerators

Ends

	Number Nine Savage Reality 357	Number Nine Revolution IV 32MB	ProLink 3D Combo plus	Proside Triosaur PRS-MP6000	Quantum3D Raven	Real3D StarFighter	STB Nitro 3200	STB Velocity 4400
Street price, PCI version/AGP version	N/A / \$100	N/A / \$200	N/A / \$180	\$200 / \$200	\$150 / \$150	\$110 / \$150	\$150 / \$150	\$200 / \$200
AGP mode supported	2X with sideband	2X with sideband	2X with sideband	1X	1X	2X with sideband	2X with sideband	2X with sideband
Graphics accelerator chip	S3 Savage3D	Number Nine Ticket to Ride IV	Intel i740	Mpact-2	3Dfx Voodoo Banshee	Intel i740	S3 Savage3D	nVidia RIVA TNT
RAMDAC speed	250 MHz	250 MHz	203 MHz	230 MHz	250 MHz	220 MHz	250 MHz	250 MHz
Tested display memory/Maximum memory	8MB / 8MB	32MB / 32MB	8MB / 8MB	8MB / 8MB	16MB / 16MB	8MB / 24MB	8MB / 8MB	16MB / 16MB
Memory type	SDRAM	SDRAM	SDRAM	RAMBUS	SDRAM	SDRAM (PCI), SGRAM (AGP)	SDRAM	SDRAM
VGA pass-through connector	■	■	■	■	■	■	■	■
TV tuner	■	■	□ (\$69)	■	■	■	□ (\$99)	□ (\$99)
DVD MPEG-2 decoder	■	■	□ (\$70)	■ (integrated)	■	■ (AGP) ■ (PCI)	■	■
Other add-on options	None	None	None	None	None	None	None	None
Maximum noninterlaced graphics resolution	1,600 x 1,200	1,920 x 1,200	1,600 x 1,200	1,600 x 1,200	1,920 x 1,440	1,600 x 1,200	1,600 x 1,200	1,920 x 1,200
Maximum refresh rate at that resolution	75 Hz	77 Hz	60 Hz	85 Hz	60 Hz	75 Hz	85 Hz	75 Hz
Maximum 3-D resolution supported	1,600 x 1,200	1,920 x 1,200	1,024 x 768	1,024 x 768	1,600 x 1,200	1,280 x 1,024	1,600 x 1,200	1,920 x 1,200
Maximum number of colors at:								
1,600 x 1,200 resolution	16.7 million	16.7 million	256	256	16.7 million	65,000	16.7 million	16.7 million
1,280 x 1,024 resolution	16.7 million	16.7 million	65,000	65,000	16.7 million	16.7 million	16.7 million	16.7 million
DVD MPEG-2 software decoder	None	None	CyberLink	Integrated	None	Integrated	None	Quadrant
DVD motion compensation in hardware	■	■	■	■	■	■ (AGP) ■ (PCI)	■	■
Digital flat-panel connector	■	■	■	■	■	■	■	■
Supports double-wide display/16:9 aspect ratio	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
TV-out	■	■	■	■	■	■ (AGP) ■ (PCI)	■	■
Drivers available for Windows 3.x / 95 / 98	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Drivers available for Win NT 3.5 / 4.0 / OS/2	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Supports hardware zoom (highest zoom factor)	■	■ (4X)	■ (4X)	■	■	■	■	■
Fully DirectX 6.0-compatible	■	■	■	■	■	■	■	■
OpenGL Installable Client Drivers available	Win 95, NT	Win 95, NT	Win 95, 98, NT	None	None	Win 95, 98, NT	Win 95, 98, NT	Win 95, 98 NT
Drivers available for AutoCAD/ Microstation/Heidi	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
24-bit z-buffer/32-bit z-buffer	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Texture memory/Frame-buffer memory	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Triangle setup engine	■	■	■	■	■	■	■	■
Edge anti-aliasing/Per-pixel anti-aliasing	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Trilinear MIP mapping/Perspective correction	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Anisotropic filtering/Palletized textures	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
MPEG video textures/Bump mapping	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Warranty	5 years	5 years	1 year	1 year	3 years	3 years	Lifetime	Lifetime
Toll-free technical support	■	■	■	■	■	■	■	■
Technical-support hours (eastern time)	8:00-6:00 M-F	8:00-6:00 M-F	6:00-2:00 M-F	Noon-8:00 M-F	8:00-5:00 M-F	8:00-8:00 M-F	8:00-8:00 M-Th, 8:00-6:00 F, 10:00-6:00 Sat.	8:00-8:00 M-Th, 8:00-6:00 F, 10:00-6:00 Sat.
Web site	www.nine.com	www.nine.com	www.prolink-usa.com	www.proside.com	www.quantum3d.com	www.real3d.com	www.stb.com	www.stb.com

N/A—Not applicable: This product is not available in a PCI version.

monitor's gamma value to match the intent of 3-D game developers; you'll appreciate the way 3Deep keeps the mood while improving visibility.

Performance was similar to other RIVA TNT boards in this roundup, translating to excellent results on the whole. The Graphics Blaster's results were in the top tier, just shy of the top-scoring boards from Diamond Multi-

media and ELSA. 3-D scene quality was fine, with only minor problems similar to those of other top-scoring boards: a few minor MIP-mapping errors, and a lack of many fogging and some geometry rasterization capabilities. In sum, if you're looking for a mid-priced board that's ready for use in both business and gaming, the Graphics Blaster should be on your short list.—Jon Hill

Diamond Monster Fusion, Viper V550

Monster Fusion: 3Dfx Voodoo Banshee; 16MB; 1,600 x 1,200 (85 Hz); AGP or PCI, \$160 street. **Viper V550:** nVidia RIVA TNT; 16MB; 1,920 x 1,200 (85 Hz); AGP or PCI, \$200 street. San Jose, CA; 800-468-5846, 408-325-7000; www.diamondmm.com. 553 at www.pcmag.com/infolink..

● Diamond Multimedia has done it again: The Diamond Monster Fusion and Viper V550 were among the fastest cards we

Nice life.



Your birth certificate. Your baby pictures. Your adoption records. Your school photos. Your homework. Your award-winning Insect report. Your graduation pics. Your scholarship-winning essays. Your senior thesis. Your multimedia resume. Your career-boosting designs. Your love letters. Your wedding announcements. Your prenuptial agreement.

Save it.



Insure your creations.

You have insurance for your car, your house, even your life. But what about all the important things you create on your personal computer? Saving your files on Iomega® Zip® and Jaz® disks gives you all the insurance you need. After all, while your files are sitting on your PC, they're not safe.



If it's wo it's wort

Your wedding album. Your kids' baby pictures. Your client presentations. Your extensive legal documents.

With 70 times more space than a floppy, Zip disks are perfect for work, home, and everything in between. And because there are Zip drives in millions of offices and homes, sharing files is always easy.



Protect against little disasters.



One minute you're staring at your tax records, the next minute, poof! Gone. Zip and Jaz drives can help shield you from the pain of losing important files off your hard drive. Simply copy them onto a Zip or Jaz disk and keep your documents out of harm's way. Because there are a million ways important files can vanish:

Power surges can wipe out entire hard drives.

Kids have been known to delete files, usually by accident. Occasionally "just because."

Computer crashes can freeze up in-progress work.

Some people accidentally delete their files, because they're human.

Internet-based viruses can damage or destroy files.

What you're doing, is saving.



Your taxes. Your museum new wing blueprints. Your grandkids' baby pictures. Your city monument site plans. Your retirement portfolio. Your autobiography. Your last will and testament.

With the new Jaz 2GB drive, you can save your life's biggest, most important work. And it's backward-compatible with the millions of Jaz 1GB disks out there.

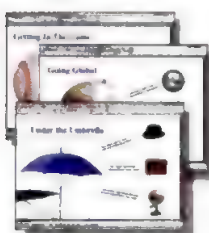
Document your life.

Take your birth certificate, your childhood photos, your wedding video, your artwork, your kids' artwork, or anything else that's a piece of your personal history, and keep it safe on Zip and Jaz disks. It's protection for all the important things you do outside your PC.



Save the day.

Imagine you're working on revision 15 of a presentation. You delete versions 1 through 10 just as the boss says to go back to version 8. Luckily, you saved all 15 versions on a Zip disk. The day is saved.



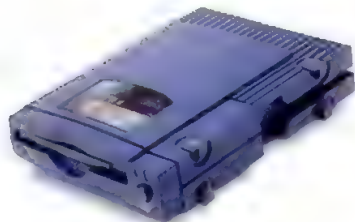
What if you lost a month's worth of your most important work files? It happens. And careers are damaged by it. Saving your biggest, most important files on Jaz disks can insure your career from taking a turn for the worse.



Get it.

zip®

The reliable, portable Zip® drive makes an ideal gift for the holidays. And, coincidentally, the colorful 100MB Zip disks are about the width of a stocking. This year, give them Zip.



Zip external drive **\$119.95**
Zip internal ATAPI drive **\$99.95**



Zip Built-In™ drives
available in Apple,
Compaq, Dell,
Gateway, HP, IBM,
and Micron.

Looking to buy a PC for the holidays? Specify one with a Zip drive already built in.

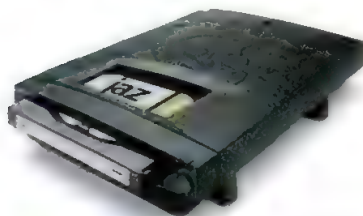
Your life is safe here.



Zip 10-pack **\$99.95**
Zip 6-pack **\$79.95**
Zip 3-pack **\$49.95**

jaz®

What to do with that holiday bonus you gave yourself. How about a Jaz® drive? It's a great way to start saving the new year.



New low price

Jaz 2GB external drive **\$349.95**
Jaz 2GB internal drive **\$349.95**



Jaz 2GB single **\$124.95**
Jaz 2GB 3-pack **\$299.95**



Jaz 1GB single **\$99.95**
Jaz 1GB 3-pack **\$269.95**

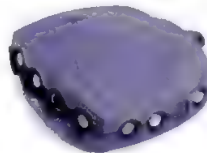
click!™

Available soon. Incredibly small, highly portable storage for digital cameras and laptops.



buz™

It's the easiest way to get your holiday videos onto your PC. Then keep them safe on Zip or Jaz disks.



Buz™ **\$199.95**

Order before the holidays at: www.iomega.com

Or buy from your favorite computer seller: Best Buy, CDW, CompUSA, MicroWarehouse, Multiple Zones, PC Connection, PC Mall, Office Depot, OfficeMax, Staples.

HARDWARE

Graphics Accelerators

examined in this roundup, and should satisfy any users who want the best 2-D and 3-D performance. Diamond covers all the bases, bundling its products with a robust array of software extras and offering both AGP and PCI versions of the hottest chips around. These cards should be on your short list.



Note that the chip and memory clocks on the Monster Fusion are faster than any other Banshee-based card, giving it an edge in benchmark testing. Diamond reworked the chip vendors' reference designs to minimize trace lengths and reduce heat that could cause system crashes. Diamond backs its products, however, with a generous five-year warranty for users skittish about reliability. Also, the drivers we received for the Viper had a performance optimization that dropped very small (but still visible) triangles, which we deemed unacceptable. Diamond submitted new drivers without the optimization (see our test summary).

Installation and utilities for all Diamond cards are among the best in the industry. A unified process installs the drivers, DirectX 6.0 (if necessary), and the vendor's InControl Tools. In our labs, the Viper performed

Mark suite at XGA resolution, posting the roundup's highest score: 497. But more often, it slightly trailed its nVidia-based sibling while staying within the very top tier of performers on all measures. Quality tests showed errors in MIP mapping, alpha blending, cylindrical wrapping, and fogging. The Monster Fusion also proved incapable of some MIP-mapping and other geometry features. But like the Viper, it

pixel-based) anti-aliasing. In game-play testing, images were very good; the only exception was a slight blurring effect on screens in Microsoft 3D Baseball, a result of the full-screen anti-aliasing process. Text was also a bit hard to read, as with other TNT-based cards. On balance, the Erazor II would suit the needs of virtually any user.

Likewise, the 3Dfx Voodoo Banshee-based ELSA Victory II was a top per-

The nVidia RIVA TNT chip powered some of the fastest accelerators in this roundup and is the current 2-D and 3-D speed leader (along with 3Dfx's Voodoo Banshee).

sailed through D3D gaming apps.

For comparison, we also looked at a 12MB version of the popular Diamond Monster 3D II (\$250 street), a 3-D-only PCI card that works with existing 2-D hardware. The card's 3Dfx Voodoo2 chip doesn't support the triple-buffered mode used in our tests, but its double-buffered performance was respectable. Under 3Dfx's GLide API, it was more reliable than other Banshee-based cards. For GLide support, this is a good though pricey option.

On balance, the Viper may offer a skosh more performance than the Monster Fusion—but at a price premium. Almost any user would be well off with either.—JH

ELSA Victory II, Erazor II

Victory II: 3Dfx Voodoo Banshee; 16MB; 1,600 x 1,200 (75 Hz). AGP, \$150 street. **Erazor II:** nVidia RIVA TNT; 16MB; 1,920 x 1,200 (75 Hz). AGP or PCI, \$170 street. Santa Clara, CA; 800-272-3572, 408-919-9100; www.elsa.com; 554 at www.pcmag.com/infolink.

former, slightly behind its sibling on some tests and slightly ahead on others. It supports virtually identical quality features, with the exception of 32-bit textures—a common fault in Banshee cards. In subjective game-play testing, scene quality was excellent. Screens in 3D Baseball were especially sharp, much better than with the Erazor II. Incoming also ran well. One caveat, however: If you expect to work with high resolutions, be wary of the Victory II's below-average Video Bandwidth Index. This score suggests that the card's analog circuitry is not equipped to turn pixels on or off quickly enough to display good images at resolutions higher than 1,024-by-768.

Generally, both ELSA cards are fine choices. They don't differentiate themselves much from similar offerings by Creative Labs and Diamond Multimedia, so you can feel free to base your purchasing decision on other factors, such as the final price and the software

**WE START WITH SINGLE OR DUAL
INTEL PENTIUM II XEON
PROCESSORS AT 450MHz.**

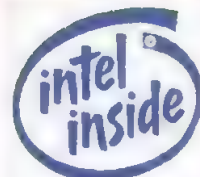


**WE CUSTOM LOAD YOUR
MISSION-CRITICAL APPS. WE
PRE-INSTALL WINDOWS NT 4.0.
THEN TEST THEM.**



**WHAT'S DELL DOING IN
NT WORKSTATIONS?**





pentium® II
xeon™
PROCESSOR

YOU TURN ON YOUR WORKSTATION AND GO RIGHT TO WORK.

Dell Precision™ Workstation 610 \$7219

Microsoft® Windows NT®
Workstation 4.0
with one-year telephone support

Pentium® II Xeon™ processor
at 450MHz with 512K cache
(dual-processor capable)

Integrage Intense 3D Pro
3410T video card

512MB ECC SDRAM (100MHz)

9GB Ultra-2/Wide SCSI
hard drive (10K rpm)

Adaptec RAIDport
Ultra-2/Wide adapter

UltraScan® 1600HS monitor
(19.8" vis)

Three-year limited warranty//
three-year next-business-day
on-site* service

Order Code:
900207

When you want a high-performance
workstation built to your exact specifications,
call Dell.

We'll build your NT 4.0 Intel®-based workstations
custom configured to your every spec. From the
2D/3D video cards to the software that runs on them.
We'll even install your own proprietary software.

Blazing speed. Outstanding graphics. Expandable
memory and the great performance and reliability of
NT 4.0. You can have it any way you want it.

Every box arrives fully tested and ready to go.
No loading or validation required. Nothing could
be simpler.

So get what you want. Exactly what you
want. When you want it. Call Dell. We're
ready to build you what you need.

1-888-678-DELL.

BE DIRECT™



www.dell.com/performance

Please call specifications valid in the U.S. only and subject to change without notice. Intel, the Intel logo and Pentium are registered trademarks, while Dell USA, L.P., Dell Way, PowerEdge, TX 76067, Active Workspace and WorkZone are registered trademarks of Dell USA, L.P. All other trademarks are the property of their respective owners. *Service available in select areas only. Technology will be required to maximize performance. © 1999 Dell Computer Corporation.

the Raptor 740 ships with a copy of Rage Software's hit game Incoming, which sells for almost as much as the board itself. True-color mode is available only up to 1,024-by-768 resolution, so users of 19- and 21-inch monitors will want to look elsewhere. Performance on our 3-D benchmark tests was near the bottom of the pack, so this is not the card for gamers. Similarly, scores on our ZD Business Winstone 99 tests were about 10 percent behind those of the fastest competitors. Thus, power users should skip ahead. We noticed no major scene flaws in 2-D or 3-D use.

Even if it isn't the fastest board we tested, the Great Magic Machspeed Raptor 740 has a jaw-dropping price that makes it a terrific bargain.—DL

Guillemot Maxi Gamer Phoenix

3Dfx Voodoo Banshee; 16MB; 1,600 x 1,200 (75 Hz). PCI or AGP, \$110 street. Montreal; 877-484-5536; www.guillemot.com; 556 at www.pcmag.com/infolink.

● This attractively priced card delivered a combination of top-flight performance and outstanding display quality across the spectrum of our objective and subjective tests. It's a good deal—and a sure bet for everything from business to gaming.

If you care about precise control over the screen image, you'll like the Guillemot drivers. An easy-to-use, tabbed Advanced Display Properties screen lets you tweak and tune a host of settings for 2-D, GLide/OpenGL, and Direct3D

Still, during subjective game-play testing, the Phoenix shone. If you're looking for a combination of excellent performance and rock-solid displays, this may be the card for you.—David A. Harvey

Hercules Terminator Beast T9318SD, T9328SG

Terminator Beast T9318SD: S3 Savage3D; 8MB; 1,600 x 1,200 (85 Hz). AGP, \$110 street. Terminator Beast T9328SG: S3 Savage3D; 8MB; 1,600 x 1,200 (85 Hz). AGP, \$130 street. Fremont, CA; 800-532-0600, 510-623-6030; www.hercules.com; 557 at www.pcmag.com/infolink.

● These twin cards, the Hercules Terminator Beast T9318SD and T9328SG, are both aimed at the multipurpose mainstream market for a mix of business and gaming uses. Though they aren't the fastest boards, they do offer a good price/performance proposition—especially the T9328SG.

The cards share a common design, with the same graphics accelerator, the same 250-MHz RAMDAC, and almost identical drivers. For an extra \$20, the T9328SG comes with S-Video and composite TV-out ports, a DVD software player, and SGRAM memory. The T9318SD model lacks these features, and its memory is the slower SDRAM.

Installing the cards proved no great challenge. But it wasn't the true plug-and-play experience promised in the manual, which claims that Windows recognizes the cards and loads the drivers automatically. We found that we had to run the boards'

tests was acceptable—but a little below the average. These cards also scored poorly on our Video Bandwidth test.

The Hercules Terminator Beast T9318SD and T9328SG both include reasonable ranges of functionality at attractive prices. The speedier SGRAM-based T9328SG is worth the extra investment.—JK

Intel Express3D

Intel i740; 8MB; 1,600 x 1,200 (75 Hz). AGP, \$75 street. Santa Clara, CA; 800-651-0163, 408-765-8080; www.intel.com; 558 at www.pcmag.com/infolink.

● With its affordable price, adequate 2-D performance, and useful software bundle, the Intel Express3D is a reasonable choice for most cost-conscious mainstream business users and nongamer home users. The card doesn't offer the 3-D horsepower of Banshee- or TNT-based cards, however, nor the high display resolutions necessary for users of big-screen monitors.

We found the Express3D easy to install, and its driver includes a modest set of graphics features, such as RGB color and gamma adjustment, brightness and contrast controls, and the ability to save and reload custom graphics configurations. Notable bundled programs include Criterion's Redline Racer, Zoran's software MPEG decoder SoftPEG, and Viewpoint's LiveArt 98 (a 3-D clip-art program).



On our 3-D benchmark tests, the Express3D's Intel i740 chip showed its age (nine whole months): The card performed at less than half the speed of our winners. The chip also couldn't support several 3-D features in our 3-D quality tests. The Express3D scored below average on our Winstone test suite at 1,024-by-768 resolution, though users can expect adequate performance on general business applications. But owners of large monitors should beware: The

The Intel i740 is a half-generation older than the fastest chips, and noticeably slower. But cards that use it are a great bargain for less demanding applications.

modes. On the downside, the bundle does not include a software DVD player, and the company does not offer a dedicated MPEG decoder daughtercard.

Like other Banshee-based accelerators, the Guillemot Maxi Gamer Phoenix generally placed in the top group of finishers. It was the fastest PCI card on our 3-D benchmark tests and scored near the top on our 2-D suite. Like other Banshee-based products, in quality testing it did prove unable to perform certain operations, including a small set of MIP-mapping, texture-mapping, fogging, and pixel-blending functions.

setup routines manually. In any case, since the manual covers four different lines of graphics adapters in several languages, the details can get a bit fuzzy. The driver does provide all the basic features one expects in an up-to-date display adapter, and the controls worked without problems.

In 3-D testing, the memory difference really showed: The T9318SD model placed in the middle tier with the other Savage3D-based boards, whereas the higher-end T9328SG edged into the top tier, scoring a respectable 429 on our 3D WinMark tests. Performance on our 2-D



Suddenly, pretty darn fast is just too damn slow.

**INTRODUCING THE NEW VIPER V550
FROM DIAMOND. THE FASTEST 2D/3D
GRAPHICS CARD YOU CAN BUY.**

2D WinBench™ 98 (Business Graphics Benchmark)

DIAMOND Viper V550

Measured in 2D WinMarks™



3D WinBench™ 98 Benchmark (Quality Check Turned On)

DIAMOND Viper V550

Measured in 3D WinMarks™



VIPER V550 BLOWS AWAY THE COMPETITION!



To keep up with today's most powerful software, start up with Diamond Multimedia's new Viper V550. It's the graphics accelerator that processes complex 2D and 3D images faster than any other card.

- 16MB of high-performance memory
- Advanced true 128-bit power
- Twin Texel engine and single-pass multitexturing for revolutionary 3D performance
- State-of-the-art 2D with real-time resolutions up to 1920 x 1200
- Display full-screen MPEG-1 video and DVD (AGP version only)
- View PC graphics and full-screen video on your TV screen
- Available in PCI and AGP 2X versions

So for the fastest 2D and 3D performance, pick up a Viper V550. And strap yourself in!



Accelerate your world.

Tests performed using Ziff-Davis' WinBench™ 98, version 1.0. Tests performed without independent verification by Ziff-Davis who makes no representations or warranties as to the results of this test. Specific system and product configuration information for this test may be found at www.diamond.com/benchmark/10011. © 1998 Diamond Multimedia Systems Inc., 2880 Junction Avenue, San Jose, CA 95134. All rights reserved. WinBench and WinMark are registered trademarks of Ziff-Davis Inc. in the U.S. and other countries.

Are you Type **Z**?

When you shop for a big-ticket item, are you better informed than the salesperson?



Do you have more bookmarks than you've had birthdays?

Do you listen to Real Audio more than your car radio?



Is the delete button on your notebook showing signs of wear?

Did you see your last vacation spot on the Web first?



Every age is defined by a certain type. The people who embrace change. Who set the trends. Who make decisions. The people who help show the way.

In this age of computers and cable, of search engines and cell phones, we call these people Type Z.

Type Zs are today's explorers. They've seen how technology can make their work easier, relationships stronger, lifestyles healthier. And they're using that knowledge in new ways every day.

You can tell Type Zs when you meet them. They get lots done, but never look burdened. They know a lot, but aren't know-it-alls. They ask really good questions, and know how to find answers fast.

In short, Type Zs know how to get stuff done, and still have fun.

At ZDNet, we're meeting millions of Type Zs every month. They see us as The High-Tech Hub, and they come to us for a combination of content, community and commerce that helps them become more efficient in their jobs, more proficient in their use of technology and more connected to the people who matter most in their lives.

Are you Type Z? Let's see.

Visit www.zdnet.com/typez and tell us why you think you're Type Z. If our judges agree, you could win a Fanta-Z adventure trip for two.

1. Start image editing software
2. Choose "File acquire"
3. Pre-scan page
4. Set scan area
5. Set resolution
6. Set scan mode
7. Scan page
8. Close TWAIN
9. Save file
10. Close image editing application
11. Start e-mail package
12. Start new message
13. Choose "attach file"
14. Locate saved file on hard disk



**How to scan and e-mail
a photo from their scanner.**

**How to do it
from ours.**

One small step for scanners. 13 fewer steps for you.

Let's face it, most scanners are not as simple
as they are supposed to be.

Drag and drop, plug and play,
billions of colors, and all the other
terms and specs don't make a bit of
difference when all you want to do is
e-mail a photo, scan a page of text
into your word-processor or any of the
other tasks you do countless times a day.

PaperPort OneTouch offers a simpler, more elegant
solution. It does most of the work for you, thanks to tight
integration with our PaperPort software.

Drop in your original. Push a button. It's that easy. Hold
down a button, change a few settings, and your
scanner is practically a whole new machine.

Sure, we have all the specs and
features you expect in a
quality scanner. But we
think you'll be much more
impressed with those five
friendly buttons up front.

PaperPort OneTouch.
All scanners should be this simple.



- Printer port pass-through design
- Lift-off lid
- Includes PaperPort software
- Windows 95/98/NT 4.0 compatible

Choose 043 at www.pcmag.com/infolink



Visit our website at pcm.visioneer.com

card's maximum true-color resolution is only 1,024-by-768.

For light-duty 2-D and 3-D use where price is tantamount, this card should suffice. Just be aware that you're not getting the latest or greatest.—JO

Leadtek WinFast 3D S320

nVidia RIVA TNT; 16MB; 1,920 x 1,200 (60 Hz). AGP, \$180 street. Fremont, CA; 888-532-3835; www.leadtek.com; 559 at www.pcmag.com/infolink.

- If you belong to the school of "plug,



play, and forget," the Leadtek WinFast 3D S320 is for you. This no-nonsense board is a good choice for users who want to get up and running without tweaking sophisticated settings. The driver is very spare but easy to use, and combined with the nVidia RIVA TNT chip's class-leading performance, it makes a good all-around package for business environments where support is an issue and AGP is the norm.

Leadtek's bare-bones software driver offers only the most basic Windows functions. You can't tweak the refresh rate or the image position. The company plans to have an updated utility by the time the WinFast hits store shelves. Like most other vendors, Leadtek doesn't offer a dedicated DVD decoder option; unlike most others, it does include a software DVD decoder from CyberLink.

The WinFast is no slouch when it comes to performance. On our 3D WinMark tests, it was in the top tier—about 50 points behind the leading entries from Diamond and ELSA. It was also a top performer on our 2-D tests. Subjective testing backed up our numbers: The card aced our suite of games tests, delivering exceptionally crisp and clean rendering on D3D-based games. The WinFast's combination of ease of use and excellent performance makes it a good pick for both 3-D and 2-D users.—DAH

Matrox Millennium G200, Marvel G200-TV

Millennium G200: Matrox MGA-G200; 8MB; 1,600 x 1,200 (85 Hz). AGP or PCI, \$130 street. **Marvel G200-TV:** Matrox MGA-G200; 8MB; 1,600 x 1,200 (75 Hz). AGP or PCI, \$300 street. Dorval, PQ, Canada; 800-361-1408, 514-822-6320; www.matrox.com/mga; 560 at www.pcmag.com/infolink.



Both of Matrox's new accelerators are based on the MGA-G200 chip, which delivers excellent 2-D and middle-tier 3-D performance. The Matrox Millennium G200 is aimed at business and CAD users who

G200-TV comes with every feature for serious multimedia and gaming fans short of an espresso attachment.

Unlike most other vendors here, Matrox offers an array of add-ons—TV tuner (\$150), DVD decoder (\$80), video-editing daughtercard (\$80), and digital flat-panel connector (\$50)—so you can change the Millennium as your needs evolve. The more expensive Marvel includes an integrated TV tuner and TV-out capabilities, and it accepts most of the same options as the Millennium. A slick external cable box for the tuner eliminates the need to hunt

The Matrox MGA-200 chip delivers solid 2-D and adequate 3-D performance. Matrox ups the ante with a full range of upgrades.

want high-resolution support, solid performance, and upgradability at a good price. It's our Editors' Choice for business users. The well-stocked Matrox Marvel

behind the PC when attaching a digital camera, VCR, camcorder, or cable TV lead. We found the Marvel's on-monitor TV quality fine; the color was well saturat-

*A guest satisfaction
survey in your room.*

A 100% Satisfaction Guarantee.

What's really important to you is all that's important to us. That's how to run a hotel. For reservations at Quality Inn or Quality Suites, visit www.qualityinn.com or call 1-800-228-5151 or your travel agent.



Inns • Hotels • Suites

HOW TO RUN A HOTEL.™

Staying Ahead Of The Competition

Everex StepServer™ CS Is Brutally Fast



ISO-9002
CERTIFIED

Powered by the Intel® Pentium® II Processor with a 100MHz front side bus and running at 450MHz, the Everex StepServer™ CS leads the pack in the departmental server platform race.

Supremely reliable like a PacWest racecar.

- Dual hot-swappable power supplies
- Up to 1GB of 100MHz SDRAM
- Dual Pentium® II Processor
- Intel® 440BX AGPset



To find the dealer nearest you, go to www.everex.com/contactus/
or call 1-800-EVEREX-1



The Intel Inside Logo, Intel, and Pentium are registered trademarks of Intel Corporation in the United States and other countries. Step is a registered trademark and StepServer is a trademark of Everex Systems, Inc. All other trademarks used herein are the property and/or registered property of their respective owners. Specifications subject to change without notice. © 1998 Everex Systems, Inc. All rights reserved.

Choose 090 at www.pcmag.com/infolink

ed and the picture almost as sharp as a dedicated TV set. The tuner is controlled via a virtual remote control with easy access to picture adjustments.

Both cards share a common installation routine and most driver features. We had no problems setting up either one, and Matrox's interface offers a robust array of controls for customizing monitor settings and the Windows desktop. The Marvel has additional controls for its multimedia

Metabyte Wicked3D Vengeance

3Dfx Voodoo Banshee; 16MB; 1,600 x 1,200 (75 Hz). AGP or PCI, \$130 street. Fremont, CA; 510-494-9700; www.metabyte.com; 561 at www.pcmag.com/infolink.

● Boasting a wealth of features and excellent 2-D and 3-D performance at an attractive price, the Metabyte Wicked3D Vengeance makes a powerful addition to any business or gaming system.

The Vengeance's comprehensive dri-

uously adjustable refresh rates, and the ability to specify screen resolutions in single-pixel increments.

The accelerator was a standout on our 2-D benchmark tests, placing at or near the top on every test. Scores on our 3D WinMark tests were very good, though the board trailed the best performers by about 10 percent. Its output quality when displaying 3-D animation

The 3Dfx Voodoo Banshee is the only chip that can go toe to toe with nVidia's RIVA TNT. It's a close horse race.

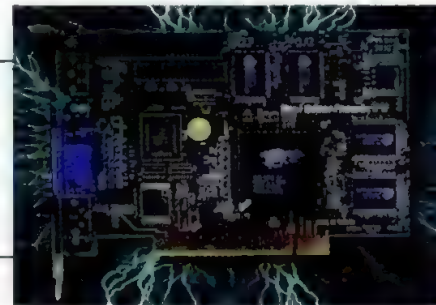
tools, plus a setup utility that walks you through configuring and testing the video ports and cabling. The manuals are clear, and there's a quick-start guide for setting up the Marvel's more elaborate cabling.

When it comes to 3-D performance, the Matrox chip is a step behind the newer offerings from nVidia and 3Dfx. Results were in the middle of the pack. The chip also registered some minor quality flaws, involving certain MIP-mapping, texture rasterization, and geometry rasterization features. But our test games played without any discernible artifacts or jittery screens, and games seemed particularly vivid—possibly enhanced by Matrox's new Vibrant Color Quality (VCQ) technique. The 2-D test scores were better, negligibly behind those of the leaders, and the Video Bandwidth results (an indicator of signal quality) were among the best we measured.

The Marvel's software bundle is excellent, and includes Ulead Photo Express 2.0, Ubi Soft's Tonic Trouble, and a trial version of VDO-Phone Internet Trial. In addition, the bundle includes the new Avid Cinema video editing software, a joint effort between Avid and Matrox.

Generally, the Marvel and the Millennium are stocked with features and software well suited for their intended markets. For the price, we wish the Marvel delivered better 3-D performance. For business users interested in a solid 2-D card with good-enough 3-D and room to grow, the Millennium is an excellent choice.—JK

ver supports a selection of 3-D graphics environments, including OpenGL and the 3Dfx GLide. It also offers a stereo mode that's compatible with the company's WickedVision H3D Eyewear System goggles, as well as exotic functions like software gamma correction, contin-



was very good, though not quite as fluid as the best Banshee-based boards. Still, the Wicked3D Vengeance is hard to beat at its price. Whether configured with or without an optional NTSC adaptor (\$15), we recommend it highly.—DL

*Welcome basket
filled with things you won't eat.*

Free local calls.

What's really important to you is all that's important to us. That's how to run a hotel. For reservations at Quality Inn or Quality Suites, visit www.qualityinn.com or call 1-800-228-5151 or your travel agent.



Inns • Hotels • Suites

HOW TO RUN A HOTEL.™

An office suite that gets you **talking** . . .



Let your voice do the typing. **Corel® WordPerfect® Suite 8 with Dragon**

NaturallySpeaking™ delivers voice-powered word processing. Just speak to your computer and watch your words appear on screen—at up to 160 words per minute. It's a great way to let your ideas flow freely, without waiting for your hands to catch up. And with improved conversion filters, you can import/export Microsoft® Word 97 documents with ease.



\$99⁹⁹†
Competitive
Upgrade



. . . and **graphics** that will leave you speechless



Give your office suite graphics punch with **Corel Print Office™**. Compatible with major word-processing file formats, Corel Print Office features clipart images, photos, business identities, templates and photo-editing tools. And it's an ideal graphics complement to your Corel WordPerfect Suite!



EUR-0845-US

Visit or call your local software dealer today to take advantage of this special limited time offer.

This advertisement was designed and created using award-winning Corel graphics software.

TigerDirect
Call toll free:
1-800-CD-TIGER
1-800-233-4437

COMPUSA
THE COMPUTER SUPERSTORE
1-800-COMPUSA
1-800-256-7872



Call now for faxed literature!
1-613-728-0826 ext. 3080
Document #1394



Go further™
www.corel.com

*Offer valid from Nov. 13, 1998 to Jan. 31, 1999

**Available in Canada and the U.S. Rebate will be issued in the currency in which the product was purchased

†Suggested retail price plus applicable taxes in U.S. Dealer may sell for less. Prices may vary from location to location

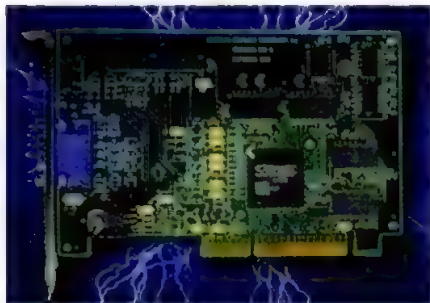
Copyright © 1998 Corel Corporation. All rights reserved. Corel, Corel Print Office, WordPerfect and the Go further logo are trademarks or registered trademarks of Corel Corporation or Corel Corporation Limited. Dragon NaturallySpeaking is a trademark of Dragon Systems, Inc. Microsoft is a registered trademark of Microsoft Corporation. All other product, font and company names and logos are trademarks or registered trademarks of their respective companies.

Choose 332 at www.pcmag.com/infolink

Number Nine Savage Reality 357, Revolution IV 32MB

Savage Reality 357: S3 Savage3D; 8MB; 1,600 x 1,200 (75 Hz). AGP, \$100 street. **Revolution IV:** Number Nine Ticket to Ride IV; 32MB; 1,920 x 1,200 (77 Hz). AGP, \$200 street. Lexington, MA; 800-438-6463, 781-674-0009; www.nine.com; 562 at www.pcmag.com/infolink.

● Number Nine's two new video boards represent the latest comeback effort for this onetime graphics-card leader. With a generous 32MB of memory, the Number Nine Revolution IV 32MB might be a



good choice for those putting together a high-resolution workstation on a budget for use in a Microsoft Windows NT environment (the vendor's traditional strong suit). This card is less successful under Windows 98, compared with the current 2-D and 3-D speed demons. The Number Nine Savage Reality 357 is a generic S3-based card with passable performance at an aggressive price.

The early-run cards we received suffered from inadequate installation procedures, though they will likely be up to speed by the time you read this. Number Nine's estimable Hawkeye utilities were unavailable for the Savage Reality, and they required a separate installation step for the Revolution IV. Both cards turned in excellent scores on our Video Bandwidth Index, which indicates good video-signal quality.

Performance in our labs was lackluster for both cards across our tests. The Revolution IV's scores on our 3-D tests were among the lowest in the roundup. Worse, scene quality during 3-D testing was uneven: The game *Incoming* looked great, especially in 32-bit mode, but Microsoft 3D Baseball suffered occasional tearing, and an incorrect text background made text boxes nearly unreadable. In 2-D testing, the unit showed acceptable performance, but it was still behind class-leading cards based on the nVidia and 3Dfx chips.

The Savage Reality did significantly better on our 3D WinMark testing than the Revolution IV yet trailed the leaders by 100 points or more—putting it in the second tier. And as with the Revolution IV, 2-D scores were acceptable but not class-leading.

Later versions of both Number Nine boards may offer improved performance and remedy the image anomalies we saw. If you need an affordable card for a high-resolution workstation, the Revolution IV might suffice, but be sure to

Prolink 3D Combo plus

Intel i740; 8MB; 1,600 x 1,200 (60 Hz). AGP, \$180 street. City of Industry, CA; 800-686-8110, 626-369-3833; www.prolink-usa.com; 563 at www.pcmag.com/infolink.

● On paper, this all-in-one graphics and video-capture board seemed a sure bet for home users, with a rich set of hardware features for everything from 3-D gaming to TV and camcorder links. But the Prolink 3D Combo plus lacks a sufficiently robust driver for bringing its video potential to reality, and it made one of the least impressive showings on

The S3 Savage3D delivers adequate performance at a compelling price. Its support for only up to 8MB of RAM is a drawback.

cross-shop the 32MB version of the Matrox Millennium G200. For good enough 2-D and 3-D support at an aggressive price, the Savage Reality is worth a look.—JH

our labs-based performance tests.

The concept is laudable: By bundling graphics and video features in a single AGP board, you save money and slot space. Unfortunately, the drivers are basic,

*A shoe horn and a
polishing cloth in your room.*

A coffee maker and coffee in your room.

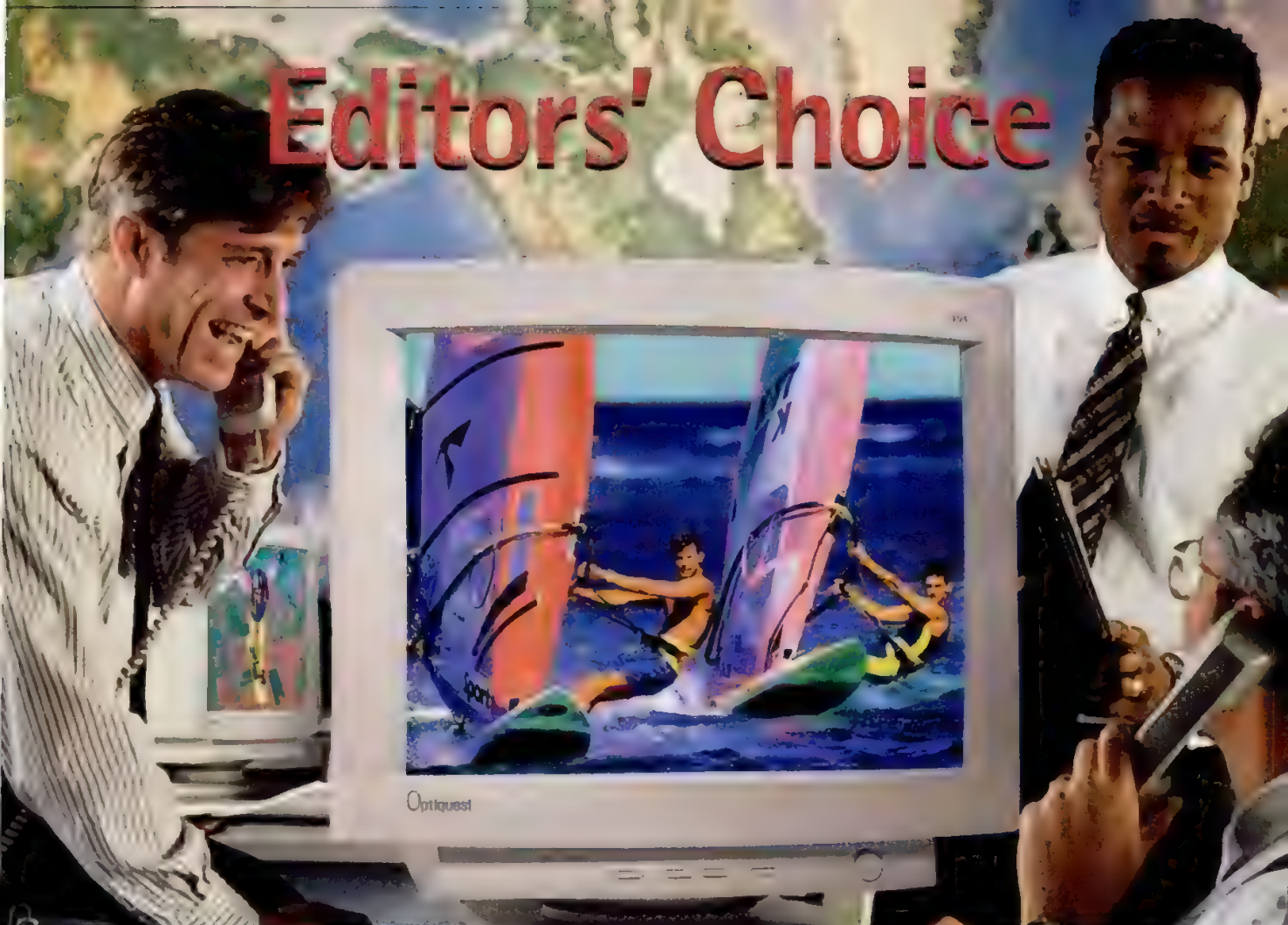
Multi-cup coffee-maker, Maxwell House coffee. Sorry, nothing for your feet. What's really important to you is all that's important to us. That's how to run a hotel. For reservations at Quality Inn or Quality Suites, visit www.qualityinn.com or call 1-800-228-5151 or your travel agent.



Inns • Hotels • Suites

HOW TO RUN A HOTEL.™

Editors' Choice



Your Choice

"Optquest® bills its monitors as consistent performers for reasonable prices, and the excellent Optquest V75 and V95 bear this out. Both are among the best in their respective size classes and perform handily in a wide variety of applications."

PC Magazine, October 6, 1998 – page 202

It's one thing for a company to claim its products are the best. But when a publication like **PC Magazine** honors it with their respected Editors' Choice, you sit up and take notice. Optquest took the concept of a large screen monitor, combined it with a small footprint, and designed a winner – the 19" (18.0" viewable) **V95**.

Imagine! A screen image large enough to handle business, graphics, gaming and Internet applications for PC and Mac® environments, yet small enough to fit into the footprint of a 17" (various viewable) monitor.



Optquest V95
October 1998

Backed by a limited 3/3/3 year warranty (3 years on CRT, parts and labor) the Optquest V95, V75 and V115 all offer impressive performance with their super fine 0.26mm dot pitch for sharp, crisp images; OnView® controls for simple on-screen *Plug & Play*™ adjustments; for easy installation with Windows® 95 and Windows® 98 and TCO and Energy Star® compliant for power efficiency – all this and more at the affordable Optquest price.

Why settle for less? The Editors' choice should be your choice in size, performance and price. Call **800-843-6784**, ask for agent 81362 to obtain the name of the dealer nearest you.

All decisions should be this easy!

	V75	V95	V115
Screen Viewable	17"/16.0"	19"/18.0"	21"/20.0"
Dot Pitch	0.26mm	0.26mm	0.26mm
Max. Resolution	1600 x 1200	1600 x 1280	1600 x 1280
Optimal Resolution	1280 x 1024 @ 69Hz	1280 x 1024 @ 88Hz	1280 x 1024 @ 88Hz



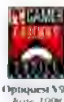
Optquest V95
September 1998



Optquest V95
July 1998



Optquest V95
May 1998



Optquest V95
June 1998

Optquest®

OPTIMIZE YOUR IMAGE™

(800) 843-6784 • (909) 869-9216
Internet www.optquest.com/pcmag

Corporate names and trademarks stated herein are property of their respective companies. Specifications subject to change without notice. Copyright © 1998, ViewSonic Corporation. All rights reserved. Microsoft, Windows, Windows NT and the Windows logo are registered trademarks of Microsoft Corporation in the U.S. and other countries.

Choose 117 at www.pcmag.com/infolink

with only single-frame display and capture controls; you're on your own if you want to start capturing or displaying video.

In our labs, the card placed near the bottom in 3-D testing. Like other Intel i740-based boards, it was unable to produce 3-D images in a true-color environment (or even in 16-bit color) at resolutions above 1,024-by-768. It didn't fare much better on our 2-D tests, delivering acceptable but hardly class-leading results. And again, it didn't have the horsepower to deliver true color at high resolutions.

Although the all-in-one idea is clever, the features are not enough to justify the price. You can get a similarly performing board for half the price from Hercules or Intel, or you can purchase a much faster card for the same money from Creative, Diamond, or another company.—*DAH*

Proside Trinosaur PRS-MP6000

Chromatic Research Mpac2-2; 8MB; 1,600 x 1,200 (85 Hz). AGP or PCI, \$200 street. Somerset, NJ; 732-271-7395; www.proside.com; 564 at www.pcmag.com/infolink.

● The now-defunct Mpac2 chip on the Proside Trinosaur PRS-MP6000 is outclassed by all the other offerings we tested in 3-D and 2-D performance, and the built-in MPEG and Dolby Digital support for DVD playback still doesn't justify this product's steep price.

The Trinosaur bristles with connectors, including outputs for Dolby Digital sound, S-Video, MPEG-2 video, and VGA. You also get cables for redirecting CD audio through the card. The only bundled software is Chromatic Research's MediaWare, including drivers for installing a DVD player and utilities for setting parameters and the like.

The Trinosaur made a less-than-impressive showing on our 3-D benchmark tests, posting a 3D WinMark score of 84; by contrast, the top-performing Diamond Monster Fusion scored 497. The Trinosaur also showed weaknesses on our 3-D quality tests, failing many of them. The unit lacks support for many standard 3-D fogging features, and it was unable to pass our anti-aliasing test and most of our MIP-mapping tests. Results were more acceptable on our 2-D tests yet still below average. Note, too, that the top resolution at true color is 1,024-by-768, so large-screen users will want to look elsewhere.

Unfortunately, there's little to recommend in the Trinosaur. If you want DVD capabilities, you're better off with a card such as the Matrox Millennium G200 (\$130 street) with an \$80 DVD daughter-card.—*DAH*

Quantum3D Raven

3Dfx Voodoo Banshee; 16MB; 1,600 x 1,200 (85 Hz). PCI or AGP, \$150 street. Santa Clara, CA; 888-747-1020, 408-919-9999; www.quantum3d.com; 565 at www.pcmag.com/infolink.

● The jet-black Quantum3D Raven is a competent performer that will likely please business users more than gamers. Excellent 2-D results were offset by middling 3-D scores compared with those of other Banshee-based cards. The modest 3-D results reflect Quantum3D's decision to clock its card conservatively, at 3Dfx's recommended 100 MHz. Although some other vendors achieve faster performance by boosting their speeds to 115 MHz, this approach risks overheating the card and crashing the system. Quantum3D has chosen the safer and more reliable path.

In other respects, the board is compe-

tent but not a standout. Unlike other Banshee entries (and RIVA TNT products, for that matter), it posted a 3D WinMark score (363) that was merely average for the group, trailing the best performers' results (which were in the mid to high 400s). The 3-D software bundle is generous, however, including Midway's GEX, Enter the Gecko, Rush the Rock, and NFL Blitz.

We also tested the company's 3-D-only product, the Quantum3D Obsidian II (\$500 street), which connects to your existing graphics card to deliver a more complete solution. Built around two 3Dfx Voodoo2 chips, this card screamed on our Graphics WinMark tests at 1,024-by-768 resolution: With its score of 493, it was far ahead of any other PCI card and tied for second place with the Diamond Viper V550.

Although the Raven is a solid value, you might want to look at the similarly priced and better-performing entries from Guillemot and Metabyte. Hard-core gamers, though, should seriously consider upgrading their systems with the Obsidian II.—*DL*

*A chocolate covered mint
and a form letter from the manager.*

A big desk and a place to plug in your computer.

What's really important to you is all that's important to us. That's how to run a hotel. For reservations at Quality Inn or Quality Suites, visit www.qualityinn.com or call 1-800-228-5151 or your travel agent.



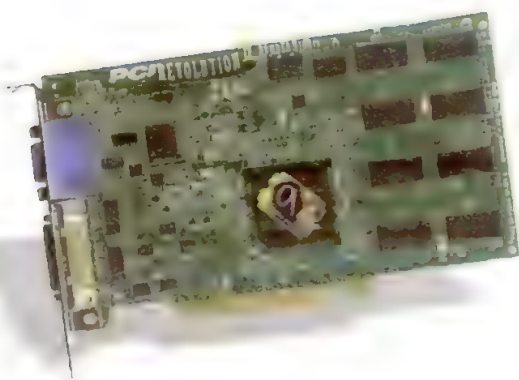
Inns • Hotels • Suites

HOW TO RUN A HOTEL.™

The World's FIRST High Resolution Digital Flat Panel Display Solution



Silicon Graphics 1600SW™ Flat Panel Monitor



Number Nine Revolution® IV-FP Graphics Card

The Ultimate Digital Flat Panel Solution Pack:

- Large 17.3 inch Silicon Graphics 1600SW Flat Panel (equivalent to 19" CRT Monitor)
- 1600 x 1024 at 16.7 Million Colors
- Unique SuperWide™ display lets you view 2 pages or applications side-by-side
- Digitally driven by 32MB Revolution® IV-FP graphics accelerator from Number Nine
- Fast 2D/3D graphics for Windows 95/98 and Windows NT 4.0
- Full-featured OpenGL and Direct3D support
- PCI and AGP configurations
- Light table image quality: 3X brighter than traditional monitors and 5X the contrast
- .23 mm dot pitch and 110 dpi display for laser sharp pictures, text and lines
- Ultra fast LCD pixel performance eliminates ghosting of moving graphics

Only \$2795 MSRP

Available Now from Number Nine through

INGRAM
MICRO

ICG™
a leading technology company

Tech Data

AMERIS E.L.
a leading technology company

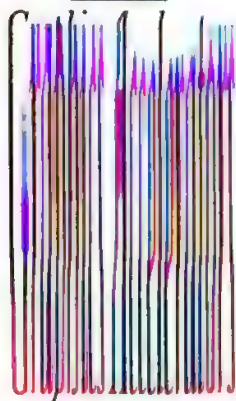
Visit www.nine.com or call 1-800-GET NINE for more information.



NUMBER NINE
VISUAL TECHNOLOGIES

www.nine.com

HARDWARE



Real 3D StarFighter

Intel i740; 8MB; 1,600 x 1,200 (75 Hz). PCI, \$110 street; AGP,

\$150. Orlando, FL: 800-393-7730, 407-208-7302.

www.real3d.com; 566 at www.pcmag.com/infolink.

● The Real 3D StarFighter sells for an attractive price, especially since the bundle includes a true hardware DVD decoder card. But its Intel i740 chip just doesn't let it keep pace with the top-tier performers.

The AGP and PCI versions of the StarFighter differ in a few important ways. The more expensive AGP model uses SGRAM (not the less-costly and slower SDRAM) and offers TV-out functionality. Each StarFighter ships with an MPEG-2 decoder card (based on the Zoran chip set) for DVD playback and a custom DVD player applet. Before you lift off, though, keep in mind that 3-D support is limited to 1,280-by-1,024 with 16-bit color, and the highest refresh rate you'll get is 85 Hz (at up to 1,280-by-1,024 resolution).

In our labs, the StarFighter had significant difficulty with the 3D WinMark quality tests: We found many errors during objective quality tests, including incorrect execution of MIP-mapping operations, many fogging operations, and several geometry features, including anti-aliasing. (Also, see the benchmark tests section for information regarding dropped frames.) Subjective game play was more forgiving, and we didn't notice any fatal flaws in scene quality. The cards scored a hair better on our 3-D benchmark tests than other i740 cards, but they were still near the back of the pack. Scores on our 2-D tests were acceptable but again below the average.

Although the DVD support is useful, Real 3D has hitched its wagon to the

TNT, though we prefer the similar offering from Creative Labs, which is priced lower.

Like all of its Savage3D-based competitors, the Nitro ships with 8MB of SDRAM; we tested it using S3's drivers and graphics control utilities, which STB will soon replace with its own. In our labs, installation was simple, though the process may change somewhat with the new driver. In 3D WinMark testing, the Nitro's scores were about average; it was bested by all the RIVA TNT- and Voodoo Banshee-based boards, as well as by two other Savage3D boards from BioStar and Hercules. On our Winstone tests, it posted some of the lowest scores, particularly at higher resolutions, bested by competitors costing about \$100 dollars less.

Display quality was excellent, and the Nitro's score on our Video Bandwidth Index test indicated ample support for high display resolutions. On our 3-D quality tests, it passed a respectable 47 of our 55 tests. The unit couldn't pass the trilinear filtering test, but the final STB driver should be able to support it. Also, the MIP-mapping function did not work properly under 3D Baseball. While STB will surely squeeze added speed from the Nitro 3200 over the next months with its new driver, early results were unimpressive.

By contrast, the Velocity 4400 offers top-flight hardware performance and useful configuration utilities, though its bundled software is unexciting. A great choice for games or big-screen, high-performance business applications, the Velocity is overkill for mainstream office work. STB drivers let you customize and save OpenGL and Direct3D settings, useful when customizing configurations for spe-



The reviews are in—and new Microsoft® Money 99 Financial Suite is a winner!

"We're so impressed that, for the first time ever, we're placing Money on our WinList, bumping our long-time favorite, Intuit's Quicken."

WinLIST Windows Magazine, 10/98

"It's clean, easy to use, draws on Web resources...and provides very good tools for daily financial management and lifetime financial planning."



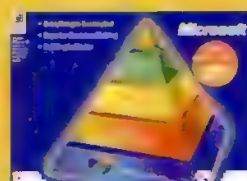
PC Magazine, 8/17/98



PC Computing, 10/1/98

"I switched from Quicken because Money 99 gives me a more comprehensive view of my finances. I can see my whole financial picture without spending hours at the PC."

Dr. William Fenn, professor, MI



Berlin?

Beijing?

Birmingham?

Barstow?

(You never know where it's going.)

But you always know how it's working.

3Com Megahertz

They're on the road. They're in the air. They're in places you can't even pronounce. But as long as you install 3Com® Megahertz® PC Cards, you can be sure your mobile workers are connecting wherever they go, whenever they get there.

Whether they're connecting over telephone lines or networks, there's nothing more dependable than 3Com Megahertz PC Cards. They include our Exclusive Line Probing technology, which compensates for phone line

3Com Megahertz PC Cards

*Exclusive Line Probing technology
Integrated XJACK® connector
Faster 56K connection over standard phone lines.
Guaranteed industry standard compatibility.*



impairments to deliver increased V.90 modem performance; and the unique XJACK® connector, which eliminates the need for extra cables.

For details and a white paper brief on our Exclusive Line Probing technology visit us on the Web at www.3com.com/mobile/elp/pcm. And learn why our PC Cards ensure reliable performance that take your mobile workers farther than ever.

3Com® More connected.™



GUESS WHO HAS THE POWER TO NETWORK?

**Introducing the PassPort™ Plug-In
Network™. Now any AC outlet is an
instant network connection.**



Networking doesn't get much easier than this. Because now you can create an instant network using nothing more than your electrical outlets and the PassPort Plug-in Network. There are no additional wires to run, no holes to drill, no intimidating cards to install in your PCs.

Simply connect the parallel cable from your PC or printer to your PassPort Plug-in adapter, plug it into any electrical outlet, load the

software, and you're done. It's that simple. In no time at all you'll be able to share a single Internet connection, printers, files or multi-user games between two or more PCs. All through the AC wiring already installed in your home or office.

To learn more about how easy—and affordable—the PassPort Plug-In Network really is, visit our Web site today at www.intellogis.com/3. Call toll-free 1-877-INTELOGIS, or stop by any CompUSA, Staples, Fry's or Tech Data. And unleash the power to network.



Save

\$20

with mail-in
rebate.

Offer expires
December 31, 1998.

Copyright Intellogis, Inc. All rights reserved. PassPort, Plug-In Network, PC Plug-In, Printer Plug-In, and Powerline Networking are trademarks of Intellogis, Inc. All other names are trademarks of their respective holders.

intellogis.
POWERLINE NETWORKING

Choose 166 at www.pcmag.com/infolink

Taming the PC

JUNGLE

Need to master a multitude of desktop systems? We tested four management packages that can help you gain control. By Greg Alwang

arguably, a network manager's biggest challenge is administering, controlling, and troubleshooting PCs and servers. Doing this right keeps your network running smoothly, lowers TCO, and yields peace of mind. Taking care of a few PCs yourself is manageable, but once you're responsible for dozens or hundreds of desktops, you'll want the help of desktop management software.

Such packages let you perform key administrative tasks remotely and automatically, saving you lots of walking-around time. Monitoring features help you detect, diagnose, and troubleshoot problems before they bring down your network. Hardware and software inventory features let you discover system configurations and loaded programs, useful for planning major upgrades. Software distribution helps you deploy even complex

upgrades and installations. And software licensing and metering let you monitor the programs loaded on each PC.

For this story, we tested the four most popular PC management suites: Intel's LANDesk Management Suite 6.1; Novell's Manage-

Wise 2.6 and Z.E.N.works 1.0 bundle; Microsoft SMS 2.0, Beta 2; and Seagate Desktop Management Suite 3.0 (see "How We Tested" for details). For reviews of managed systems, turn to "Corporate PCs" in this issue.

DMI MAKES THE DIFFERENCE

The broad acceptance by PC manufacturers of the DMI (Desktop Management Interface) 2.0 specification means management suites should have a better chance of predicting and diagnosing PC problems before they occur. DMI provides a standard for capturing detailed device-level inventory and monitoring real-time information,

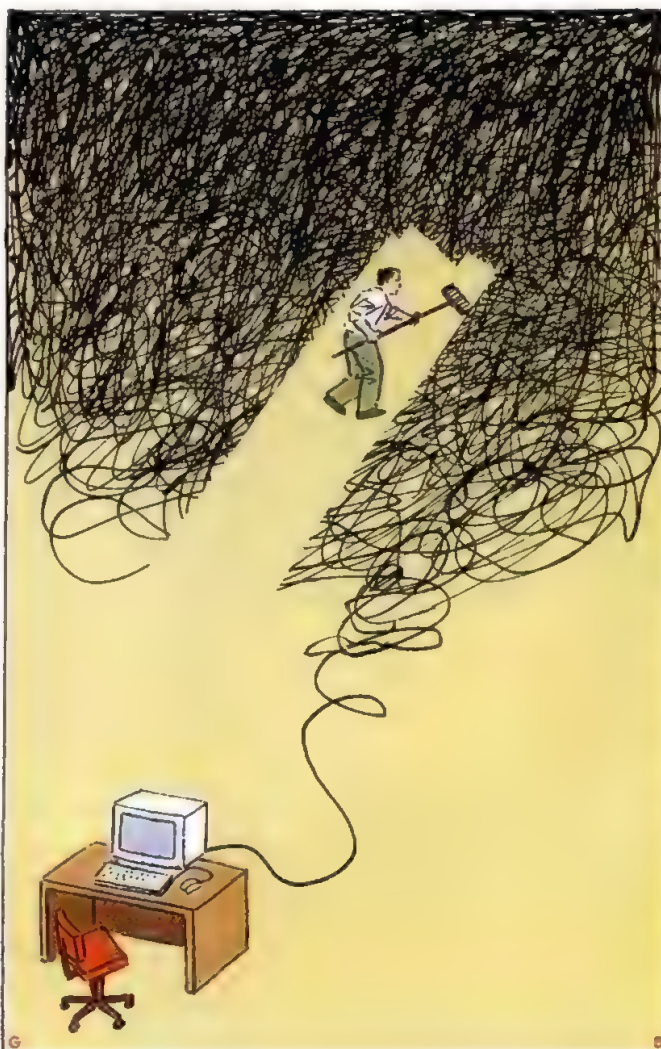


ILLUSTRATION BY GUY BILLOUT

Join us online All files mentioned in this section are available for downloading from our Web site. www.pomag.com

Desktop Management Suites

such as processor temperature. DMI should be a boon for administrators in lowering TCO, but we found that support for the standard varied. More surprising were the varying degrees of DMI compliance we found among the managed PCs. (See the sidebar "What 'DMI-Compliant' Means Today.")

Predictably, LANDesk provided the best DMI integration: Intel is a member of the DMTF (Desktop Management Task Force), which wrote DMI, and a leading provider of the DMI agents that are preinstalled on the managed PCs. LANDesk Client Manager (LDCM), which includes DMI Explorer, also came bundled with many of the managed PCs we tested.

SMS also accesses DMI information, rolling it directly into the inventory infor-

LANDesk Management Suite 6.1	280
ManageWise 2.6, Z.E.N.works 1.0	282
Microsoft SMS 2.0, Beta 2	286
Seagate Desktop Management Suite 3.0	288
Editors' Choice	280
What "DMI-Compliant" Means Today	282
How We Tested	284
Summary of Features	286

mation for each desktop. Seagate's DMS can't access DMI information directly but can read DMI-generated MIF (Management Information File) data stores. Z.E.N.works has no DMI support, but Novell plans to add it.

CONTROLLING THE FLOOR

These products do more than save you time, though. By using the software distri-

bution capability in conjunction with metering, you can better enforce corporate standards and control access to applications. DMS monitors configuration-file changes and sends alerts when any unauthorized system changes are made. Z.E.N.works goes a step farther, integrating with Windows' Policy Editor to let you create standard Windows desktop configurations that follow users from PC to PC.

SMS dynamically updates software distributions: If a software package is sent to the PCs in the accounting group and a new user joins the group, for example, SMS will send the package to that user. Moreover, if the user of a Windows NT desktop doesn't have sufficient rights to perform the install, SMS automatically invokes Windows NT's administrator privileges to permit it. Similarly, Z.E.N.works detects when a PC lacks files from a distributed program and downloads them from the server.

Both LANDesk and ManageWise provide virus protection, and DMS provides a server/client backup program. DMS includes a Y2K BIOS checker, and SMS reports on Y2K compliance of Microsoft applications.

PICKING THE RIGHT PACKAGE

With the exception of SMS, each suite's components are also sold separately, so you can mix modules from different vendors. But this approach will lose you component integration and likely cost more per node. Often, large organizations combine an enterprise system management (ESM) package such as IBM's Tivoli or CA's Unicenter with desktop management components. Most vendors here follow standards such as SNMP that let their modules pass alerts and device data to a central ESM repository. Seagate's software distribution module WinInstall integrates smoothly with ESM systems by writing directly to ESM application logs.

We expected ManageWise and SMS to integrate tightly with NetWare and Windows NT, respectively. But each vendor also makes a concerted effort to support multi-NOS environments: SMS discovers NetWare resources and NDS clients, and ManageWise allows Windows NT-based consoles. LANDesk and DMS are designed for multi-NOS environments, thus giving balanced support to NetWare and Windows NT. DMS is the only pack-

Suitability To Task



POWER

Installation and setup

Management

Hardware and software inventory

Software distribution and updates

Software license metering

LANDesk Management Suite 6.1

Excellent

Good

Excellent

Good

Excellent

ManageWise 2.6

Good

Good

Fair

Excellent

N/A

Microsoft SMS 2.0, Beta 2

Good

Fair

Fair

Fair

Fair

Seagate Desktop Management Suite 3.0

Good

Fair

Good

Excellent

Good

EASE

Installation and setup

Management

Hardware and software inventory

Software distribution and updates

Software license metering

Fair

Good

Good

Good

Excellent

Fair

Fair

Good

Good

N/A

Good

Good

Excellent

Fair

Good

Good

Fair

Good

Good

Fair

N/A—Not applicable. ManageWise does not perform software license metering.

Each network is unique. To determine which desktop management suite best suits yours, consider your network's characteristics and what tasks are most critical or are performed most often. We rate each task according to *power* (the ability to perform precisely the function you want) and *ease* (of installation and performing the task). Note that the ratings for Microsoft SMS 2.0, Beta 2, reflect our evaluation at the time of testing, not the potential of the finished product.

For **installation and setup**, we consider the length of time required to install the package on the server. This includes installing the database and console only. The products with the best *ease* ratings provide intuitive installation procedures, include options for proceeding with a minimum of user input, and are generally trouble-free. Installations requiring downloaded patches rate lower. A product with a high *power* rating provides a customizable and flexible installation process.

The **management** rating reflects how well each product lets you maintain the network's health. This task rolls in remote-control capability and setting alerts and notifications, as well as managing and monitoring your NetWare and Windows NT servers. High *power* ratings go to products that provide multiple options for sending alerts, let you set alert thresholds and customized responses, and provide

multiple server statistics and management options.

Hardware and software inventory lets administrators track current client and server configurations—anything pertaining to the operating-system environment, display settings, disk parameters, and configuration files. Highly rated products deliver lots of depth and a multitude of parameters, accurate inventory scans, and flexibility in terms of customized reports, operating-system support, and database choices. We are most impressed by products featuring DMI support.

Software distribution and updates can free administrators from administering software to each desktop by hand. We look for easy-to-configure distribution packages and powerful features such as distribution undo and the ability to prompt the user to accept an installation package. The highest ratings go to products with a lot of flexibility in terms of scheduling options, push/pull options, and bandwidth control.

The **software license metering** capability lets administrators track the number of instances of a program installed on the network, as well as limit the number of concurrent instances—useful if you're concerned about violating a license agreement. The best products make it easy to administer metering and offer flexible tools, such as the ability to track DLLs separately from EXE files, along with options for dealing with clients that are in violation.

You're 1,500 miles
from the office.



But only **15**
seconds from
that file you need.

Introducing HotOffice,[™] the world's first Web-based intranet service for small business. Nothing makes life easier for the road warrior. You can securely access all your vital information, day or night, from any Web connection. Get HotOffice today. And you'll be on the road to success, no matter where you are.

\$12.95/mo. per user, including:

- Remote file retrieval & posting
- Team document sharing
- Online document viewer
- Web-based e-mail
- Web-based calendar
- Private bulletin boards
- Company chat rooms

 **hotOffice**[™]
Anytime Anywhere Officing[™]

30-day free trial www.hotoffice.com

Choose 002 at www.pcmag.com/infolink

1-888-4HOTOFFICE

age that reports on Macintosh clients, though. If you're running a Windows NT network, SMS gives you a distinct advantage—the new Microsoft Management Console (MMC). You can use it to access all your Windows NT administrative tools from a single location. NetWare shops reliant on NDS will want the tight integration offered only by ManageWise.

If you run a mixed network, picking the right package isn't as clear-cut. Each has strengths and weaknesses you must weigh against your own needs. LANDesk has the best DMI support as well as Server Manager, an excellent component that monitors both NetWare and Windows NT servers. DMS has the most powerful software distribution module, but only ManageWise and SMS provide LAN-traffic monitoring and statistics.

In larger WAN installations in particular, deploying these suites requires careful planning. You must map out which servers will act as management, database, metering, and distribution servers. In multi-NOS networks, you must decide to invoke inventory, metering, and distribution agents from NetWare or Windows NT log-on scripts. LANDesk provides an Install Consultant wizard, which guides you through the preplanning and installation steps. Our advice: Don't expect to install and deploy any of the following packages in an afternoon, and be prepared to contract with a systems management firm if you're not up to the task. Read on to see which package best suits your network.

LANDesk Management Suite 6.1

List price: 100 nodes, \$6,250. Intel Corp., Santa Clara, CA; 800-628-8686, 408-765-8080; www.intel.com; 900 at www.pcmag.com/infolink.



LANDesk Management Suite 6.1 packs desktop management punch with cross-platform server monitoring and the strongest DMI integration we saw. The toolset was the most mature and well integrated here, yet the suite's cost per node falls in the middle range—making it an excellent value. Moreover, LANDesk's distributed architecture lets you start small and scale up to support thousands of users—a great choice for mixed networks. It earns our Editors' Choice.

The suite combines a tightly integrated

Editors' Choice

• LANDesk Management Suite 6.1



With improved installation routines, tighter integration, and DMI 2.0 support, the new generation of desktop management suites give network administrators greater control than ever. The packages here each provide a hefty toolset, but one stands out—offering the best-integrated, most powerful, and easiest-to-use features, coupled with nimble scalability and peerless DMI support: Intel's LANDesk Management Suite 6.1 (100 nodes, \$6,250 list).

Though not the cheapest suite we tested, LANDesk gives you your money's worth. Its features are tightly integrated with the management console. LANDesk's architecture offers the choice of keeping management functions on one server or distributing them. This provides you with great flexibility in designing and scaling your

toolset with an intuitive interface. The management components delve into both servers and clients. Server Manager, like SMS's HealthMon, discovers all NetWare and Windows NT servers and monitors their health using customizable thresholds. Desktop Manager provides software metering and distribution, and Client Manager views and diagnoses DMI-capable PCs and those preinstalled with LANDesk's Client Manager agents. DMI Explorer lets you view details on the health of networked PCs. Client virus scanning is included; server virus protection is handled by Intel's Virus Protect Client, sold separately.

Installation requires careful preplanning of management structure, especially in multi-NOS environments. You can centralize LANDesk functions on one core server, but if you have a large instal-

network. Although the full benefits of DMI compliance are still to come, LANDesk provided the most detailed reporting on our network of DMI-compliant managed PCs.

Despite encountering some rough spots in testing Microsoft SMS 2.0, Beta 2, we found that the product's potential is also clear: Microsoft has added some terrific new components, such as HealthMon, which flags system problems. And capable wizards make installation much easier.

At \$3,995 (list) for 100 nodes, Seagate Desktop Management Suite 3.0 is a great deal, distinguished by powerful software distribution, support for Macintosh clients, and its popular backup package, WinInstall.

lation or an inexperienced IT staff, consider enlisting a specialist to apportion the management, database, distribution, and metering to multiple servers. Fortunately, the HTML-based wizard, Install Consultant, helps automate your management domain's design.

LANDesk captures in-depth hardware and software details during scheduled client inventory scans, then stores the inventory in a Microsoft Access database and presents it in collapsible-tree format. You can create and save inventory queries, then run canned reports against them to itemize just the clients you need.

By right-clicking on the icon of any PC in the Desktop Manager window, you access a host of remote-control options, including drag-and-drop file transfer, chat, remote reboot, and remote-execu-

Our Contributors: GREG ALWANG is a contributing editor and FRANK J. DERFLER, JR., is the senior networking editor of *PC Magazine*. TIMOTHY J. OAKES is a staff consultant at Walker Systems Support in Farmington, Connecticut. RUSS IWANCHUK was the project leader, and TONI F. KISTNER was the associate editor in charge of this story.

Calling the World at Local Rates...

Free
Int'l Call
in Comdex at
Booth S2870
(Sands)



SRP US\$ 149.00



Introducing **COMPRO™ Ezfone**, a truly revolutionary telephony adapter that allows users to call the world over the Internet at local charges. It offers superior voice quality similar to a cellular phone.

Built for Internet phone calls, **Ezfone** capitalizes on the convenience of a regular phone. It allows users to call through any touch tone phones or cellular phones* without touching the PC. Powered by a 40MIPS DSP **Ezfone**, delivers superior audio quality for a smooth and interrupt free conversation.



ACS Innovations, Inc.
3171 Jay St. Santa Clara CA. 95054
Tel: (408) 566-0900 • Fax: (408) 566-0909

Choose 081 at www.pcmag.com/infolink

<http://www.acscompro.com>
TEL: 888-2-COMPRO

*applicable to Ezfone Pro model only

COMPRO™
By ACS Innovations

What "DMI-COMPLIANT" means today

The Desktop Management Interface (DMI) provides a standard way for PCs to report the status of their internal hardware. Though not all managed PCs and desktop management suites use the DMI features with equal vigor, everyone's going in the right direction.

The combination of DMI-capable PCs and DMI-aware management software lets administrators access and diagnose device-level system characteristics in real time—something past network management software could only partially provide using proprietary software agents. You can browse the processors on all your desktops or check the temperatures of all the NetWare, Unix, and Windows NT servers on a LAN. If you find that a server is running too hot, for example, you can remotely check whether all its fans are still spinning.

We're seeing concrete DMI 2.0 support in desktop management software, with Intel and Microsoft leading the way. Intel includes the LANDesk Client Manager (LDCM) console with its LANDesk Management Suite 6.1. LDCM contains DMI Explorer, which lets you view DMI information directly on any DMI-equipped PC on your LAN. In SMS, Microsoft has implemented DMI's Common Information

Model (CIM) for inventory, so all inventory data is interoperable between DMI-compliant systems. On the OS front, Microsoft builds CIM capabilities into Windows 98 and will include it in Windows NT 5.0.

We tested the abilities of 28 managed PCs (the same units we review in this issue's feature "Corporate PCs") to let you discover, diagnose, and manage DMI-reported characteristics. The results were surprising. Only 20 were able to run the DMTF's stringent DMI compatibility-checking program, and not one passed all of the tests. Fortunately, most of the PCs supported the DMI features that count—namely, device-level inventory, remote diagnostics, and alerting.

When we tried to discover DMI-capable PCs with the desktop management suites, we received mixed results. Some desktops were immediately available in LANDesk's DMI Explorer, whereas others appeared only when we forced alerts on the PCs. For the PCs we did discover, we could investigate granular device information and perform basic remote diagnostics. Moreover, Remote Wake on LAN (WOL) worked on only 5 of the 22 PCs on our test-bed (the PC from small vendor HIQ was one). Though most of the PCs had WOL BIOS options, not all had WOL-compliant network cards. We found better DMI reporting from the best-known PC vendors—Compaq, Dell, HP, IBM, and the like. Smaller vendors Acer, Axis, GST, NEC, NexTrend, and Quantex deserve mention as well. Our tests demonstrated the value and promise of DMI. It's useful now and should be a part of your management plans.—GA

tion features for each PC. Remote control gives administrators hands-on diagnostic capabilities for servers and clients, and it saves time by improving the chances of resolving problems on the first call.

Like DMS, LANDesk comes with a package builder that takes snapshots of the workstation before and after the management suite installs an application, making it easier to back out of an installation if necessary. You can move packages to clients using push or pull methods. But unlike DMS and SMS, LANDesk requires you to build separate Windows 95 and NT packages even for programs that install safely on both platforms, such as WinZIP. Though this guards against installing a program to the wrong platform, it takes extra work. The task scheduler lets you distribute packages at specified times and track delivery status. If your PCs support remote Wake on LAN, you can revive them and install the packages automatically. Also available is LANDesk Configuration Manager (100 nodes, \$2,000 list), a companion program that distributes desktop configurations—including OS and software upgrades—from a central location.

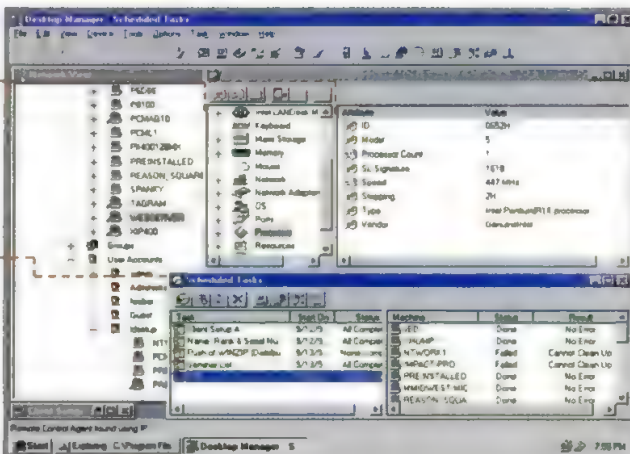
LANDesk's software-

metering module lets you meter both local and network copies of applications and suites, share licenses across servers, and generate reports on usage trends, license denials, and overflows. In addition to setting expiration dates on applications, you can get a real-time picture of which applications users are running. We used the flexible alerting system, which works across all LANDesk modules, to set thresholds and generate administrator alerts when licenses approached their limits. In case tight network security is imperative, the product offers a certificate authority (CA) service that uses digital certificates to authenticate users and LAN-Desk operations.—GA

You can access inventory, metering, software distribution, and remote-control features from a common, intuitive UI.

The powerful task scheduler works across all modules and lets you schedule and track the status of software distributions and custom inventory-form updates.

Using LANDesk's package builder and task scheduler, you can easily distribute software installations and upgrades to clients and track the status of the tasks.



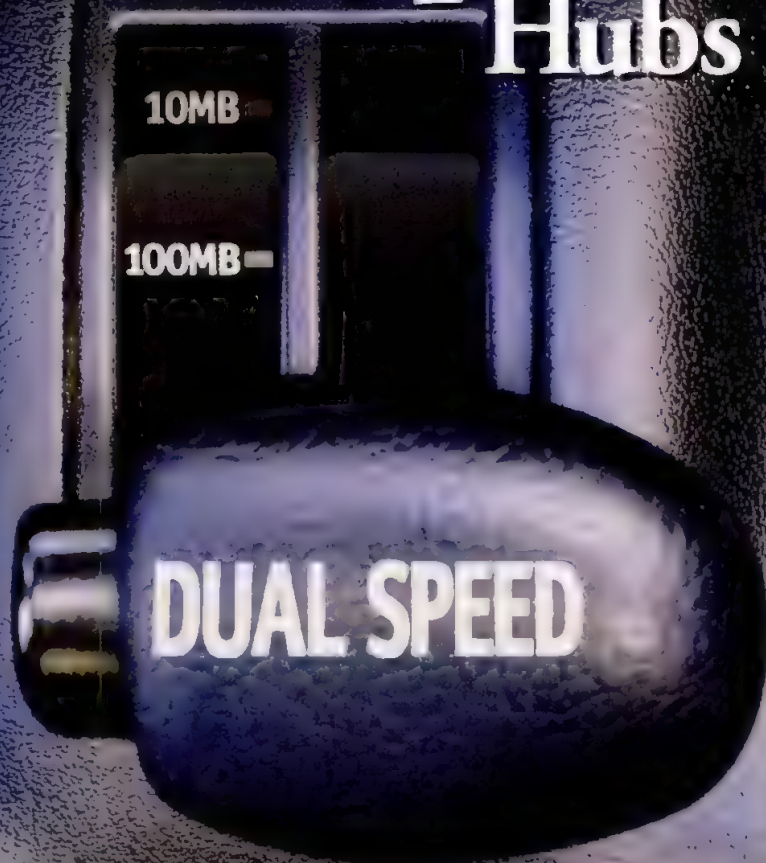
Manage Wise 2.6, Z.E.N.works 1.0

List price: 100 nodes, \$7,295. Novell Inc., Provo, UT; 888-321-4272, 801-861-7000; www.novell.com; 901 at www.pcmag.com/infolink.

● If you rely on NetWare Directory Services (NDS) to manage your network, you'll find the combination of Novell's ManageWise 2.6 and Z.E.N.works 1.0 attractive. The suite integrates smoothly with NDS and leverages considerable power through NetWare's NWAdmin program. Novell has taken great care to integrate the NetWare family with Windows, but unlike the other suites, this one reaches its full potential only in NetWare shops. Also, there's no current support for DMI, though the company has plans to integrate it.

ManageWise reports on the server components and physical topology of a network; on a separate console, Z.E.N.works provides desktop management and policies. Novell doesn't offer software-metering tools, but like Intel's LANDesk, ManageWise bundles a server and desktop antivirus component—in this

Shift Into High Gear With *Dual Speed* Hubs



DFE-904
4-port 10 or 100



DFE-908
8-port 10/100



DFE-916
16-port 10/100



DFE-2624
24-port 10/100

New Ethernet SOHO and Workgroup Network Solutions.

- Dynamic Dual Speed NWAY auto-sensing between 10Mb and 100Mb*
- Simple plug-and-play installation
- Integrated segment switch option allows 10/100 communication
- Stackable up to five units
- Flexible migration path to Fast Ethernet
- Limited Lifetime Warranty
- Industry standard interoperability

Choose 333 at www.pcmag.com/infolink



D-Link®

800 326-1688
www.dlink.com

*NWAY is a registered trademark of Intel Corporation. D-Link is a registered trademark of D-Link Corporation. DFE-904, DFE-908, DFE-916, and DFE-2624 are trademarks of D-Link Corporation. ©1998 D-Link Corporation. All rights reserved.

Desktop Management Suites

case, InocuLAN. Generally, the suite aims at reducing network operating costs through inventory tracking, software distribution, and control over user-inflicted problems. But it also provides tools for controlling printers, remote control for troubleshooting, and many other functions. Z.E.N.works contributes to cost control by adding flexibility and usability to the desktop policy capabilities built into Windows.

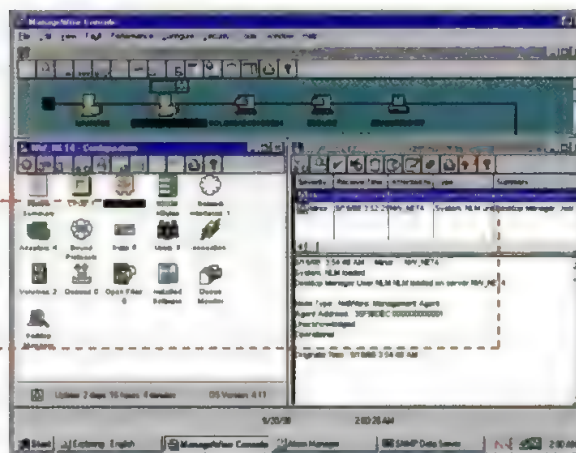
If you understand NDS, you can install the suite yourself. A setup wizard guides the installation of ManageWise and Z.E.N.works, but you also must take several manual steps. You must use the latest NetWare client on each PC—not the one provided in Windows—which, for a large network, could mean a massive upgrade project. Also, a frustrating aspect of Z.E.N.works is that desktop objects must be entered manually. In SMS, they are created automatically.

Remote-control options provided by both ManageWise and Z.E.N.works aid the help desk in troubleshooting user problems. Z.E.N.works sends commands

Through the configuration window, you can easily access server information—for example, data on NLMs.

By clicking an alarm button, you can determine the source of a server's problem.

ManageWise's powerful configuration tools provide desktop customization features, remote control, and inventory.



to the Policy Editor utility in every Windows client. This lets you set desktop policies for the content as well as the look and feel of each desktop, and even set limits on user actions.

The Policy Editor lets you create user packages for specific types of PCs, operating systems, internal equipment, and so on. For example, you can specify that all 486-based PCs in the accounting department have the same software, reporting functions, and desktop look, but that Pentium-based PCs have other

features. People who use multiple desktops can bring their user rights to each machine they use. Z.E.N.works also eliminates the need to log on twice—once for the OS and once for the network—under Windows.

The ManageWise console includes more than 650 alarms based on reports from the server modules, including over 100 new alarms for NDS-related issues. Out of the box, you can send EXE and Broad-

cast alerts, but to send e-mail or pager messages requires a third-party plug-in.

ManageWise provides robust inventory for NetWare servers, tracking 15 categories of information. It cannot monitor Windows NT servers without ManageWise NT Server Agent (\$700 street), though. Z.E.N.works provides hardware inventory for all Windows systems, viewed in neatly organized tab format in NDS's Windows NT Workstation object.

Z.E.N.works lets you set up software distribution in two ways. The application

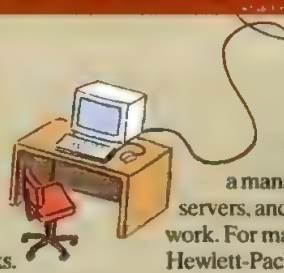
HOW WE TESTED

Desktop Management Suites

We put each suite through its paces on a network containing server and client operating systems these products can manage: a NetWare 4.11 server, a Windows NT 4.0 server, a Windows NT 4.0 Workstation client, and a Windows 95 client.

We evaluated how each suite increased desktop management productivity by focusing on a series of administrative tasks. We monitored the systems' health and statistics, inventoried hardware and software configurations, distributed software packages, metered software usage, sent notifications and alerts based on triggers, remotely controlled client systems, and protected the systems from virus infection.

After installing the software packages on a management server and on desktop clients, we began using them to perform administrative tasks. To test inventorying capabilities, we had the server create an inventory of our client machines, checked to make sure the inventory scan was taking place, and compared the results with the known computer configuration. We created custom software packages—for example, one for rolling out the latest version of WinZip—and distributed them. To evaluate software metering, we set an application to be metered with a low metering limit, launched enough copies to exceed the limit, and observed the results. To monitor NetWare and Windows NT server health, we installed the server management client on each server and monitored it using the network management console. We remotely controlled computers from the server console and activated any antivirus capability provided.



Each test network consisted of a management server, managed servers, and clients on an Ethernet network. For managed servers, we used a Hewlett-Packard NetServer LF (Pentium 66 with 64MB of RAM) running NetWare 4.11 and a Dell Dimension Pentium 166 (Pentium 166 with 64MB of RAM) running Windows NT Server 4.0 SP3. The client systems were an HP Vectra XU (Pentium MMX/150 with 32MB of RAM) running Windows 95 with NetWare 4.11 SP5 and a Dell OptiPlex GX1 (Pentium II/400 with 128MB of RAM) running Windows NT Workstation 4.0 SP3. The platform for the management server was either a Dell PowerEdge 2200 (Pentium II/233 with 128MB of RAM) or a Dell OptiPlex GX1 (Pentium II/400 with 128MB of RAM). We installed the server running ManageWise on NetWare 4.11 SP5; all other products were installed on the server running Windows NT Server 4.0 SP3.

—Analysis written by Russ Iwanchuk



WITH THE
SHIVA GUARANTEE,

THE ONLY RISK IS NOT BUYING YOUR VPN FROM SHIVA.

For network managers everywhere, VPNs offer the promise of increasing network capacity, reducing costs and ensuring security. But let's face it, if those are your real concerns, you need more than promises. That's why every Shiva VPN solution

is backed by a Shiva 30-day money back guarantee. It's not something you're likely to get from most VPN providers. But then, other VPN providers don't have the largest VPN installed base or can look you straight in the eye and tell you that remote business access is the only business they're in. We can. Need more evidence that a Shiva VPN adds up to cost savings for you? Then download our free VPN ROI calculator at <http://guarantee.shiva.com>.



It'll help calculate your costs per remote user and show you first hand how much a Shiva VPN solution will save your organization. For more information, contact Shiva at 1-800-97-SHIVA. After all, why should you incur any risk with your VPN if you don't have to?

Shiva.

To learn more about what VPNs can do for your business, register for a free VPN seminar at <http://seminar.shiva.com>

©Copyright 1998 Shiva Corporation. All rights reserved. Shiva, the Shiva Logo and the Shiva Connects Logo are trademarks of the Shiva Corporation.

Desktop Management Suites

called snAppShot lets you take before-and-after pictures of a client's software installation, then imports the package to NDS as an object that can be used to distribute the application to other clients. Or you can create objects in NDS directly. The objects can be associated with users or workstations for distribution, and flexible scheduling lets you deploy

new packages at preset intervals.

ManageWise and Z.E.N.works together deliver a complete tool for tracking issues and changes in a NDS-reliant network, excepting capabilities for software metering and licensing. Novell plans to provide tighter integration between them, as well as a common management console interface.—*Timothy J. Oakes*

SUMMARY OF FEATURES

Desktop Management Software

PC MAGAZINE
EDITOR'S CHOICE

	LANDesk Management Suite 6.1	ManageWise 2.6	Microsoft SMS 2.0, Beta 2	Seagate Desktop Management Suite 3.0
■ YES ■ NO				
List/street price for 100 nodes	\$6,250 / N/A	\$7,295 / \$4,750	\$4,617* / N/A	\$3,995 / \$2,800
NetWare 3.x/4.x/5.x	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Windows NT 3.51 / 4.0	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Management console platform	Windows 95, 98, NT	Windows 95, 98, NT	Windows 95, 98, NT	Windows 95, 98, NT
Supports inventory for:				
Windows 95 / 98 / NT	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
DOS/Macintosh	■ ■	■ ■	■ ■	■ ■
Windows 3.1 / OS/2	■ ■	■ ■	■ ■	■ ■
Inventories Windows NT/NetWare servers	■ ■	■ ■	■ ■	■ ■
Included database	Microsoft Access	Btrieve	SQL Server	SQL Anywhere
DMI 2.015-compliant	■	■	■	■
Checks software/hardware Y2K compliance	■ ■	■ ■	■ ■	■ ■
Can distribute to:				
Windows 95 / 98 / NT	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
NetWare/DOS/Macintosh	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Windows 3.1 / OS/2	■ ■	■ ■	■ ■	■ ■
Supports push/pull methods of distribution	■ ■	■ ■	■ ■	■ ■
Can trigger distribution updates	■	■	■	■
Alerts manager when license is exceeded	■	■	■	■
Can set metering thresholds	■	■	■	■
Can specify users' applications access	■	■	■	■
Can graph application usage over time	■	■	■	■
Can remotely control:				
Windows 95 / 98 / NT	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
NetWare/DOS/Macintosh	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Windows 3.1 / OS/2	■ ■	■ ■	■ ■	■ ■
Supports certificate authentication	■	■	■	■
Supports remote Wake on LAN	■	■	■	■
Collects network traffic statistics	■	■	■	■
Monitors server log-on attempts and security	■	■	■	■
Monitors server CPU/memory/disk utilization	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Monitors client CPU/memory/disk utilization	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Notification methods supported:				
Message box/e-mail/pager	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Broadcast / EXE / SNMP trap	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Includes virus checker for servers/clients	■ ■	■ ■	■ ■	■ ■

N/A—Not applicable: The vendor does not cite a street price.

* This is the price of SMS 1.2; the price of SMS 2.0 was not available at press time.

Microsoft SMS 2.0, Beta 2

List price: 100 nodes, \$4,617. Microsoft Corp., Redmond, WA; 425-882-8080; www.microsoft.com; 902 at www.pcmag.com/infolink.

● A multifaceted desktop management tool, Microsoft SMS 2.0, Beta 2, is the major component of the vendor's Zero Administration Workstation (ZAW) initiative. Though it doesn't provide details on NetWare servers, SMS provides a powerful and flexible suite of tools for Windows NT networks at a good price. The final version should be available by the time you read this. Though we had to cope with some rough edges testing the beta product, Version 2.0 provides some great new features and greatly improved ease of use.

Version 1.2's installation was daunting, but the wizards in Version 2.0 deftly guided us through, installing and setting up SQL Server automatically—a marked improvement over prior routines. SMS needed about half an hour to, populating the database and management console with components and features. Upon completion, the server didn't require a reboot. The interface is built on top of the bundled Microsoft Management Console (MMC), a snap-in approach that lets you create customized consoles for administrators with specific duties, for example, as well as identify resources and distribute agents.

SMS 2.0 has improved capabilities for interacting with NetWare networks. It detects NetWare log-ons and can send agent software to gather data and report from the desktops. HealthMon monitors Windows NT servers, tracking many statistics currently available in Performance Monitor. In the version we tested, HealthMon had no functionality beyond setting component thresholds and viewing status. Microsoft confirms that the final version will also provide alerts to problems.

SMS hardware and software inventory functions track more than 200 properties on each desktop. Inventory is evaluated on the client machines, with only *delta information*—data that has changed—passed back to SMS. It also provides a full inventory history, as well as a Y2K database that checks the inventory of Microsoft software and lets you add programs from other vendors.

SMS's software distribution feature is

Things you won't need to install a Symphony cordless home network.



First, came the cordless phone. Now, Proxim introduces the cordless computer network for the home.

Now you can get all the benefits of high speed home networking without the hassles of installing a wired network or the high cost of having someone else do it for you.

Plug into the Proxim Symphony™ cordless home network. It uses secure radio technology — not cables — to network your computer at a fast 1.6 Mbps data rate.

Symphony networking means you can share printers, files and modems just like a regular Ethernet network. Even better, Symphony lets you share your Internet connection simultaneously among all the

computers in your home — with only one ISP account, one phone line and one modem.

With Symphony, you're in charge: put your computers and peripherals where you want, not where your phone jacks dictate. Symphony will cover virtually any home and its immediate surroundings. If you're a laptop user, you can even surf the Web or send email from your couch, kitchen table, bedroom or patio!

So save your tools for more important projects. Check out the Proxim Symphony cordless home networking solution — and where you can buy it — at www.proxim.com/symphony4. Or, call us at 1-888-549-3758 for full details.

Symphony™

proxim

Choose 105 at www.pcmag.com/infolink

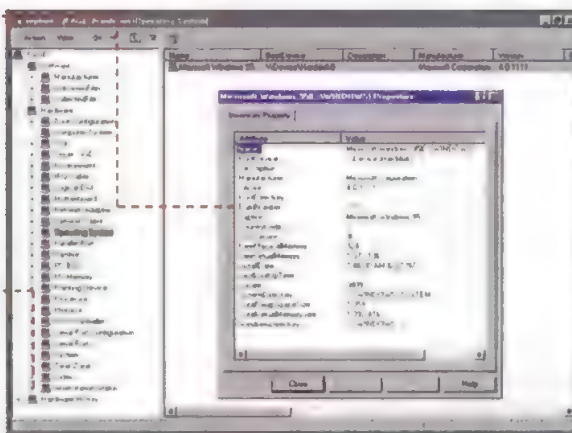
© Proxim 1998. Proxim and Symphony are trademarks of Proxim Inc. All rights reserved.

flexible. *Collections*—the attributes of distribution recipients, can be tailored to any variables maintained by SMS or related to the Windows NT domain architecture. A wizard helps automate distribution but can't create a new package; you must define it manually. There's a wide range of choices when scheduling a program advertisement, which notifies clients that software is available. So they won't interfere with network operation, you can set advertisements to occur at off-peak times, and you can control bandwidth usage on the WAN to prevent network bottlenecking. In the past, software distribution under SMS ran up against challenges of access rights. Microsoft has added the Elevated Privilege feature, which automatically passes security information to the Windows NT desktop to complete an install.

You can use the extensive hardware and software inventory information to create Collections for package distribution, such as BuildNumber for operating-system updates.

Hardware history is also maintained, letting you track and identify changes causing problems or incompatibilities.

SMS provides extensive hardware and software inventory for package filtering, eliminating the hassle of identifying every user with a certain type of card.



We found the metering and licensing function to be full-featured. Application files are registered and tracked via *passive license* restrictions, employed just for monitoring usage, or *aggressive licensing*, which denies access when the license limit is reached. You can set license denials with a callback option, which notifies users when a program is available.

At times, problems made the package difficult to assess. For example, when we

tried to send a software package to "all Windows 95 systems," it went out to all PCs on the network. Microsoft attributed such glitches to development issues and the beta status, and it plans to address and repair the glitches before releasing the final product.—TJO

Seagate Desktop Management Suite 3.0

List price: 100 nodes, \$3,995. Seagate Software Inc., Heathrow, FL; 800-327-2232, 407-531-7501; www.seagatesoftware.com; 904 at www.pcmag.com/infolink.

● Seagate has made a name for itself in the desktop management arena by acquiring and refining some top-notch tools. Seagate Desktop Management Suite (DMS) 3.0, the least expensive product we tested, combines the best of them into a well-integrated, cross-platform management environment that works well with ESM packages. DMS provides in-depth inventorying and the most flexible software distribution we saw. Moreover, it's the only suite here to

Not Just Another Pretty Face

Starting at only
\$169

Control up to 4 computers using one keyboard, monitor and mouse with SwitchView!

At only 8 inches across, this sleek, compact unit takes up less room on crowded desktops. Combine that with the economical price and SwitchView is quite an attractive package!

But don't be fooled . . . there are brains behind this beauty.

Built-in mouse translation lets you use a PS/2 or IntelliMouse to control any attached PC - serial or PS/2 style. Keyboard or front panel push-button switching, automated scanning and industry standard cables make the SwitchView easy to use too! Two and four port models are available.

Not your usual lightweight. For more information on this exciting new KVM switch, contact us today.



"SwitchView from Cybex Computer Products offers an affordable and reliable solution to the space headaches that multiple computers cause."

—Internet Computing



Cybex Computer Products Corporation | www.cybex.com | 1-800-932-9239

Cybex, the Cybex Logo and SwitchView are trademarks or registered trademarks of Cybex Computer Products Corporation. Microsoft, Windows NT and IntelliMouse are trademarks or registered trademarks of Microsoft Corporation. Novell and NetWare are registered trademarks of Novell Incorporated.

See us at Fall Comdex, Nov. 16-20, Las Vegas, Booth #54470



WANT TO MAKE GLOBAL NETWORKING EASY?



HERE'S THE CARD

Introducing the most flexible and reliable, modular PC Card in the world – Gold Card NetGlobal. This globally approved V.90 modem and Ethernet PC Card has the option to add ISDN functionality.

What's more, you can connect to a PCS 1900/GSM mobile phone with our fully licensed accessory kits. So wherever your workforce is, this PC Card is the ideal mobile communications solution.



It's ready for anything – solid, robust

Gold Cards incorporate Rockwell Semiconductor Systems Inc V.90 technology

and built to last, Gold Card NetGlobal is backed by Psion Dacom's lifetime warranty.

You're guaranteed reliable, approved solutions thanks to our working partnership with Eicon, Ericsson, Motorola, Nokia and Rockwell.

For your next smart move – call us at: 1 888 322 6601. Or E-mail us at: connectusa@psion.com



EXPERTS IN MOBILE NETWORKING



Nokia is a registered trademark of Nokia Corporation.
Ericsson is the trademark or registered trademark of Telefonaktiebolaget LM Ericsson

www.psiondacom.com
Choose 357 at www.pcmag.com/infolink

The Internet is made up of zeros and ones.
Which does your provider make you feel like?



EASY SET-UP, INCREDIBLY
FAST CONNECTIONS, KILLER
24-HR. CUSTOMER SUPPORT
AND PRICING FROM \$6.95
TO \$19.95/MO. UNLIMITED.
PLUS, BIG PREPAYMENT
DISCOUNTS. OUR INTERNET
SERVICES WERE DESIGNED
WITH YOU IN MIND.



MindSpring
INTERNET SERVICES



www.mindspring.com Call now 1-888-MSPRING

Choose 089 at www.pcmag.com/infolink

Desktop Management Suites

provide comprehensive backup management as well as reporting on Macintosh clients.

The suite consists of WinLand for inventory, WinInstall for software distribution, WinSmart for license metering, Proxy for remote control, and the well-proven Backup Exec for server and client backup. DMS uses Seagate's Crystal Report engine and includes more than 80 standard reports.

You can also create custom reports and save multiple criteria sets for each of them.

DMS includes a single-server license of Seagate's Backup Exec, which lets you back up the server and any number of desktops. For remote diagnostics, DMS has the Proxy remote-control client; but unlike the other three suites, it doesn't provide file-transfer, chat, or remote-reboot options.

You call one mega-setup routine to install the DMS components and to update any NetWare log-on scripts with calls to inventory, metering, distribution, and remote-control DMS agents. You must update client Windows NT log-on scripts manually. If you don't use log-on scripts, you'll need to put the agents in the Windows Startup group on each client. After completion, a floating toolbar lets you easily launch any of the modules.

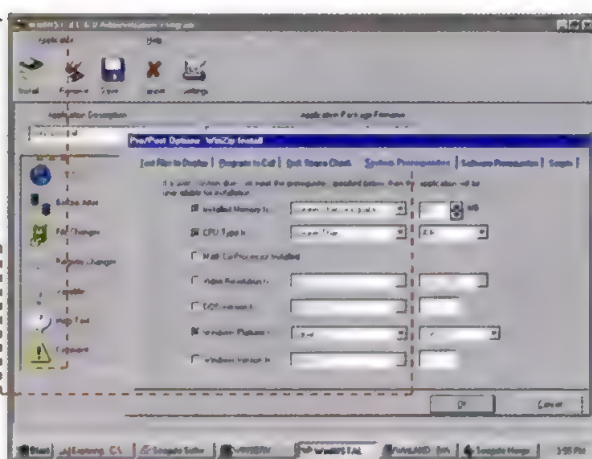
WinLand uses tabbed pages to select inventory and component categories, such as hardware, software, network, Windows, files, and changes. Like the collapsible views in LANdesk and SMS, the tabbed pages let you drill down to details. But DMS goes farther by providing overview tabs for broad categories. The changes tab lets you identify files to monitor for changes and track the versions. When a file changes, you can generate an alert and even view the file with changes highlighted. This is a great way for support desks to monitor unauthorized or accidental changes and installations on desktops.

DMS includes a Y2K BIOS checker that you run from each desktop via a floppy disk. The program sends the results to the inventory database. If you have several PCs with the same BIOS type and date,

You can distribute software packages using a variety of methods, including forced push, interactive pull, e-mail attachments, and Windows NT services.

You get extensive control over preprocessing and postprocessing of distribution jobs, such as the ability to verify that workstations meet criteria you've determined.

Seagate's WinInstall gives you extensive control over creating and processing distribution packages, even letting you install a package as a Windows NT service.



you need to run the scan on only one such system; WinLand will update the compliance status on all the others.

WinInstall provides the most robust software distribution capabilities we saw. It can update distribution logs in HP OpenView Desktop Administrator, Tivoli, and Unicenter, as well as create SMS-specific distribution packages. WinInstall provides extensive control over the software update

packages via the Discovery Wizard utility. Unlike LANdesk, this product lets you edit a package after creation. WinInstall offers several ways to distribute updates, including using various push and pull methods, sending the package as an e-mail attachment, or letting users pull the package from a Web page. For installations on Windows NT clients that require administrative rights, DMS lets you use a Windows NT service option to handle the security issues and even install the package while no clients are logged on.

WinSmart offers basic license metering, and as with LANdesk and SMS, you manually add applications to meter and set license thresholds. The program can generate SNMP, e-mail, or pop-up message alerts based on license criteria. WinSmart also includes a helpful check-out/check-in feature that lets mobile users check out products, so you can track the licenses of disconnected users.—GA PC

Feeling SCSI Because You're Spending Too Much \$ for RAID?

Open IDE RAID solutions for half the price of SCSI

Save your butt with real-time data protection and no downtime

End expensive SCSI with RAID 0,1 & low-cost IDE

FastTrak RAID 0,1 card for up to four UDMA/EIDE drives



FT440BX Only motherboard with dual IDE RAID 0,1 ports



FastSwap Pre Dual "Hot" Swap pull-out drive units with FastTrak card



800-888-0245

www.promise.com/ideraid_pcmag.htm

Network Experts Say Easy to Install.

"Right out of the box, Snap! Server instantly connected to the live network providing a multigig volume. It's really a little, but powerful data warehouse."

Manager, Computer Operations, PowerBar, Inc.

"For small business and workgroups of less than 100 users, Snap! is a tailor-made storage solution."

Smart Reseller, August 17, 1998

"Snap! Server offers a quick, convenient fix for stressed-out file servers."

Small Business Computing & Communications, Hardware Pick: Snap! Server, August 20, 1998

"It installs quickly, is easy to use, and is painless to administer."

Infoworld, Snap! Server Simplifies Small-Network Storage Chores, May 25, 1998

"The easy installation process provided instant storage and eliminated the need for downtime."

Project Coordinator, Frega Associates Ltd Architects-Engineers

"Snap! Server's small form factor and instant connectivity allows the team to access mission-critical information and provides true file and network portability."

Data Acquisition Engineer, Bettenhausen Motorsports

"It takes five minutes — no exaggeration — to plug in the Snap! Server to a network, power it up and program it for use."

Nation's Business, A Network Storage Product that's true to its name, June 25, 1998



MERIDIAN®

Snap! Server is a trademark, and the Meridian logo is a registered trademark of Meridian Data, Inc. ©1998 Meridian Data, Inc. All rights reserved. Corporate names and trademarks are the properties of their respective companies.

Our Snap! Server Is Easy To Afford.

Fully configured and network ready
for Microsoft® NetWare®
and peer-to-peer networks.

Optimized specifically for network storage.
You get the performance of a typical PC
file server — for a lot less money.

Available with up to 16 Gigabytes
of storage for just \$1795.

Easy local and remote
administration via your
web browser.

8GB Snap! Server™
\$995

With an unconditional,
30-day money-back guarantee.

Snap! Server saves the time
and labor it takes to tear
apart your existing server to
upgrade or add extra drives.

Anyone can install the Snap!
Server without disturbing your
existing file server — or
bringing the network down.

No additional
software to load — or extra
licensing fees to pay.



For information, and to register for a chance to win your own Snap!
Server — FREE, visit www.snapserver.com/pcm or call 1-888-343-SNAP

Snap! Server is now available through these
leading national resellers.

COMPUSA
The computer superstore
1-800-CompUSA

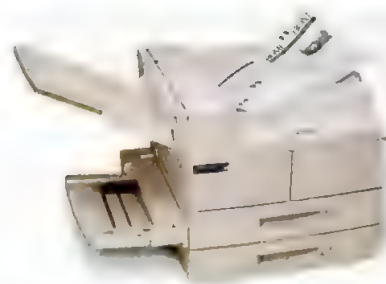
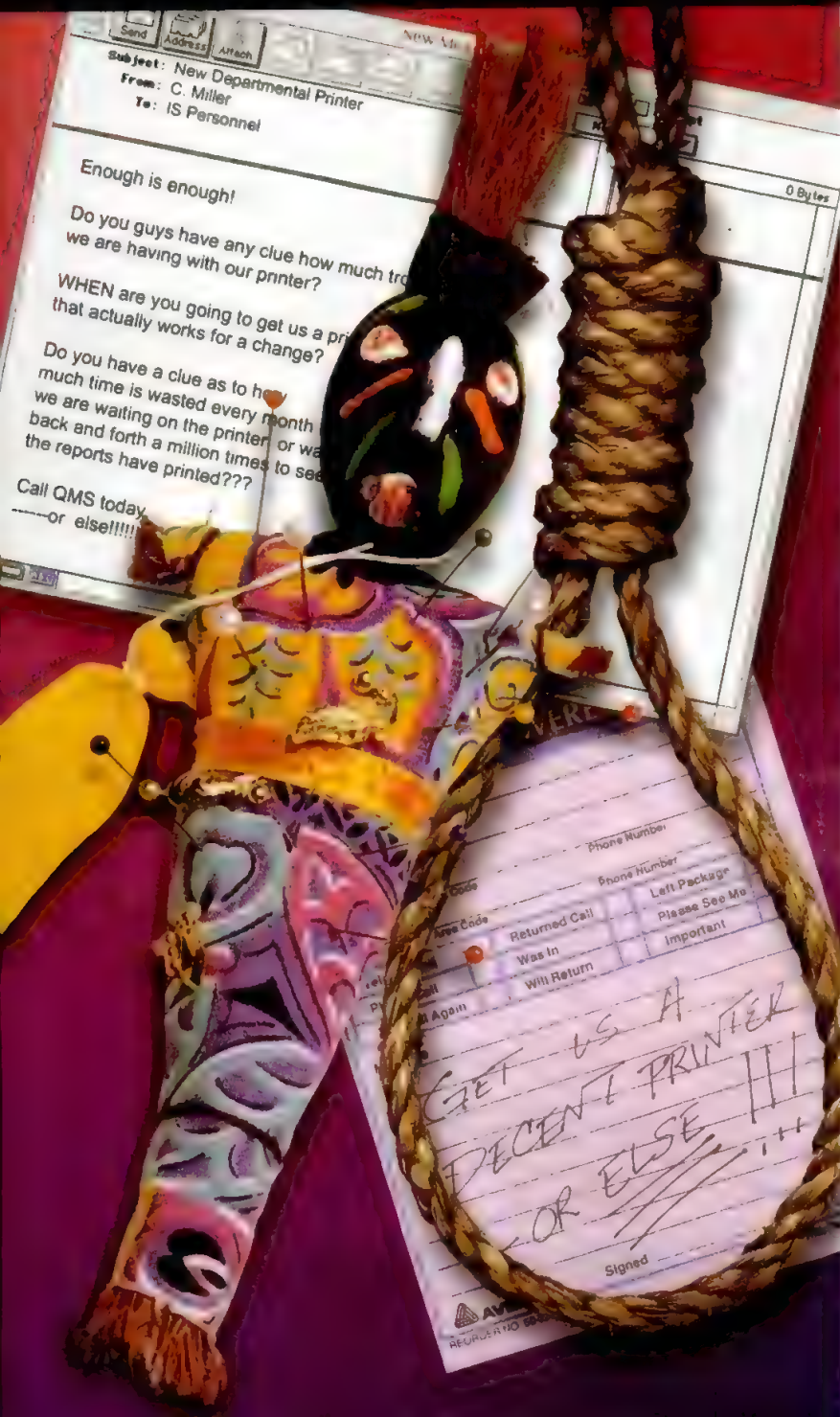


Data Comm
WAREHOUSE
1-800-328-2261

Choose 191 at www.pcmag.com/infolink

IT, MIS, LAN professionals:

Tired of all the hate email, death threats, surly co-workers, the evil eye, and those stupid dolls riddled with pins that sorta, kinda resemble yourself?



Then meet your new best friend... the QMS® 3260 Print System

Speed and Performance

32 ppm, 150 MHz processor

Powerful Crown® Controller

Job spooling, multiprotocol, serverless printing

Network Ready

10BaseT/100BaseTX Ethernet

CrownAdmin 3

Manage and configure any network printer remotely

CrownView

Monitor and configure the printer with any Internet browser

Email Paging

Let the printer notify you when it needs attention — via email or pager

Auto-Install Utilities

Easy set-up, easy to use

Documents on Demand

3,550 sheets maximum input; duplex, staple, collate, and job offset

It Copies, Too

Add copy capabilities for only \$399*

The Right Price

Starting at \$3,199*; 1¢ per page at 5% coverage

*Everything you ever wanted
in a workgroup printer,
and then some!*



1-800-523-2696

www.qms.com

*All prices in US dollars

©1998 QMS, Inc. QMS, the QMS logo, Crown, CrownAdmin, and CrownView are registered trademarks of QMS, Inc. All other trademarks or registered trademarks are the property of their respective manufacturer. 10/98

Choose 024 at www.pcmag.com/infolink

**The Best
AntiVirus
Protection**



The Best Antivirus Product

Panda Antivirus is the most certified antivirus in the world, detecting 100% of the viruses "in the wild"

The Best Antivirus Service

- Daily Updates
- 24h-365d Technical Support
- SOS Virus 24h

Visit Us At M-750

COMDEX
Fall 98

Put A Panda In Your PC

Choose 209 at www.pcmag.com/info/ink



(800) 603-4922



presents

Face-Off '98

hosted by **Michael J. Miller**



Be there as the top companies in today's hottest technologies go head-to-head in two days of intense competition! Which digital camera performs the best? Who's on the cutting edge in speech recognition software? You vote for the winners in eight sizzling categories!

See for yourself how the products really stack up.

Las Vegas Hilton Ballroom A

Tuesday • November 17
2:30 pm - 4:30 pm

Portals
Speech Recognition
Web Graphics

Wednesday • November 18
2:30 pm - 4:30 pm

Digital Cameras
Ultraportable Computers
Electronic Books
Inkjet Photo Printers

JUDGE HOT NEW PRODUCTS BY

• RealNetworks • Dragon • Lernout & Hauspie • Excite • Infoseek
• Microsoft • Macromedia • Kodak • Canon • Hewlett-Packard
• Nikon • EveryBook • NuvoMedia • Lexmark • Epson • Philips

Only at

COMDEX
Fall '98

November 16-20, 1998 • Las Vegas, Nevada

To register online and get the latest Face-Off competitor list, go to www.comdex.com.
Or visit www.pcmag.com.



Data Comm WAREHOUSE

3Com 10/100 Adapters as low as \$64⁹⁵ each

See below for details



Cisco • Netgear • Ascend • Hayes • Intel • Bay • APC • 3Com • US Robotics

Networking Essentials at Low Prices!

APC
200VA UPS Only
\$89⁹⁹!
Item # DUP2000

HP EX PLUS PRINT SERVER
Only
\$229⁹⁹!
Item # DEP1233

NEW!

3COM
ETHERLINK XL
10/100 PCI ADAPTERS
As low as
\$64⁹⁵! each, in 20-pk
Item # DBN0717

HEWLETT PACKARD
Expanding Possibilities

ETHERNET CARDS

DEC3002: Samsung SmartEther 10B-T ISA	\$9.99
DEC3199: Addtron PNP Combo Adapter	\$17.99
DEC1473: 3Com EtherLink III 10BT ISA TPO	\$59.95

FAST ETHERNET ADAPTERS

DEC3477: Addtron 10/100 PCI	\$21.99
DEC2454: Netgear 10/100 PCI Adapter	\$29.99
DEC3229: Netgear 10/100 PCI Adapter 10-Pack	\$279.99
DEC2968: Intel 10/100+ PCI	\$74.99
DEC3010: Intel 10/100+ PCI 5-Pack	\$369.95
DEC3262: SMC EZ card 10/100 PCI	\$24.99

PC CARDS

DEC2554: 3Com Etherlink III 10BT PCMCIA	\$129.99
DEC2942: 3Com Fast Etherlink 10/100 16-bit PC Card	\$149.99
DMD3583: 3Com 10/100 LAN+ 56K Modem PC Card	\$299.99
DET1594: Linksys 10/100 16-bit PCMCIA	\$79.99
DEC3524: Xircom Realport 16-bit 10/100 PC Card	\$134.99
DMD3563: Xircom Realport 16-bit 10/100 LAN + 56K modem	\$319.99

MODEMS

DMD3947: USR 56K Fax/modem - Internal	\$127.99
DMD3441: USR 56K Fax/modem - External	\$147.99
DMD3528: Hayes Accura 56K Internal	\$69.99
DMD3527: Hayes Accura 56K External	\$79.99

*Capable of 56Kbps downloads, however current FCC regulations limit downloads to 53Kbps.

ETHERNET ROUTERS

DEB1950: Netgear ISDN Router RT328	\$279.99
DMD3068: 3Com ISDN LAN Modem	\$389.99
DEB1652: Webamp M3 4-Port Analog Router	\$349.99
DEB1603: Cisco 1601 Ethernet/Serial Router	\$1139.00

FAST ETHERNET HUBS

DEH2408: Netgear FE104 4-Port 100BTX	\$95.99
DEH2409: Netgear FE108 8-Port 100BTX	\$149.99
DEH3589: Netgear 8-Port Auto 10/100	\$219.99
DEH3670: 3Com Office Connect 8-Port Auto 10/100	\$359.99
DEH3631: Linksys Etherfast 8-Port 10/100	\$169.99
DEH3632: Linksys Etherfast 16-Port 10/100	\$319.99
DEH3634: Linksys Etherfast 24-Port 10/100	\$469.99

ETHERNET HUBS

DEH2383: Asante Friendlynet 8-Port 10BT w/Uplink	\$59.95
DEH2384: Asante Friendlynet 5-Port 10BT w/Uplink	\$49.99
DEH3955: 3Com OfficeConnect 8TPO 8 10BT	\$79.99
DEH2050: Allied 8-Port 10T Hub w/Uplink	\$54.99
DEH2051: Allied 4-Port 10BT w/Uplink	\$44.99
DEH1647: Netgear 8-Port 10BT Hub Internal Power	\$89.95
DEH2544: Netgear 4-Port 10BT Hub w/Uplink	\$39.99

KVM SWITCHES

DSD1181: Bellon OmniView 4-Port	\$249.99
DSD1982: Cybex Commander 4-Port	\$749.99
DSD1983: Cybex Commander 8-Port	\$869.99

• Your credit card will not be charged until each item is shipped (no surcharge).
• Overnight Delivery available, please call for shipping details. CT, IL, NJ, OH, VA, and WA residents add applicable sales tax.

• Return Policy - All items come with the MicroWAREHOUSE 30-day Guarantee Against Defects. If your product is defective you must call our Customer Service Department at 1-800-925-6227 for a Return Merchandise Authorization (RMA) number within 30 days of original invoice date. Defective hardware will be replaced or repaired at our discretion, except for products from Compaq (1-800-652-6672).

Hitch (1-800-555-8820), or IBM (1-800-426-7378). These manufacturers must be contacted directly, and will repair or replace products at their sole discretion. If you return hardware to MicroWAREHOUSE from Compaq, Hitachi, IBM, or USA Flex, a 15% restocking fee which will be charged to your account. All products must be returned in original packaging with documentation; shipping and handling charges are not refundable.

Copyright © 1998 Micro Warehouse, Inc. Micro Warehouse, Inc. is not responsible for typographical or photographic errors that may appear in this ad. Item availability and price are subject to change without notice. We reserve the right to limit quantities.

Cisco 2500 Routers

Cisco Systems
Class 2501
Now only
\$1659⁰⁰!
Item # DEB1802

- Full-featured, rack-mountable 2 synchronous serial ports each supporting up to T1 speeds
- Auxiliary port for dial back-up.

Cisco 2514; only \$1949. Ask for item # DEB1809.

Ascend Pipeline Routers

Ascend
Pipeline 71
Only
\$559⁰⁰!
Item # DEB2316

- ISDN routers with 2 analog ports

Pipeline 50; only \$489.95. Ask for item # DEB2311.

FriendlyNet 8-Port 10BT Hubs

ASANTE
Only
\$59⁹⁵!
Item # DEH2383

- 10Base-T
- Mfr's lifetime warranty
- Free technical support

5-port hubs; only \$49.99. Ask for item # DEH2384.

SuperStack II Dual Speed 500 10/100 Hubs

3Com
As low as
\$679⁹⁹!
12-port
Item # DEH3481

24-port (shown); only \$1039.99. Ask for item # DEH3480. While promotional supplies last.

Netgear DS 108 Dual Speed Hub

Bay Networks
Only
\$219⁹⁹!
Item # DEH3589

- 8 auto-sensing 10/100Mbps ports
- One uplink port
- Integrated LEDs
- Stackable (up to 8 units)
- Manufacturer's 5-year limited warranty

1-800-981-9205 ★ www.warehouse.com/pm

ORDER TOLL-FREE 24 HOURS A DAY, 7 DAYS A WEEK!

MicroWAREHOUSE
The largest direct computer reseller in the world

**EXPRESS DELIVERY
OVERNIGHT!**

In-stock items, call by midnight (E)

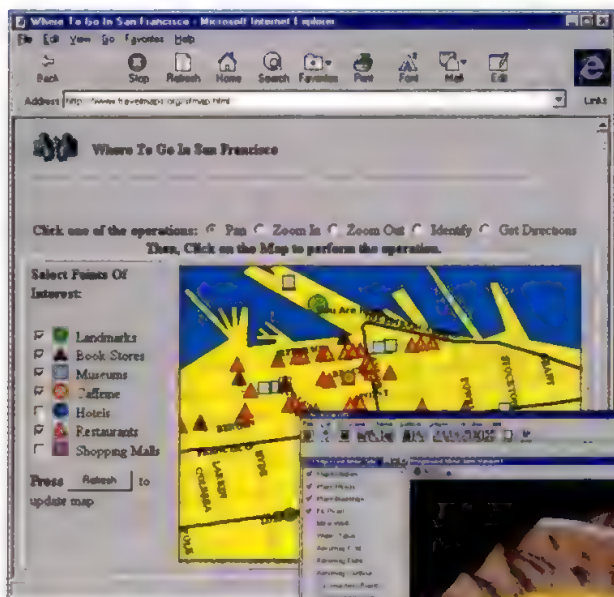
Hi, I'm Robert. Call me for more great deals!



EXTEND YOUR VIEW OF THE WORLD

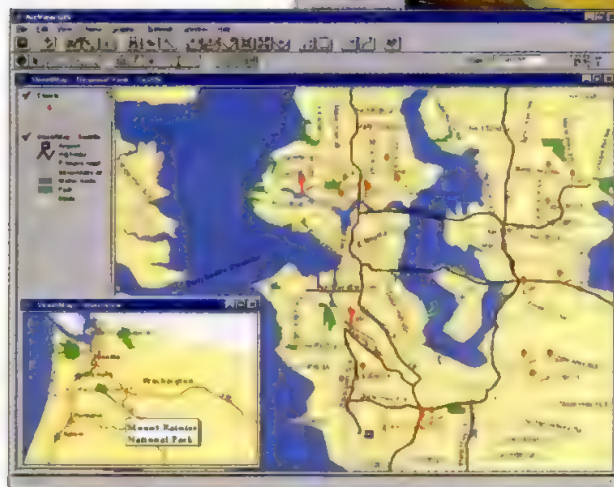
Now Shipping!

ArcView® GIS 3.1 complete with new productivity tools and wizards, a link to Seagate® Crystal Reports™, and support for AutoCAD® Release 14 drawings



From dynamic
map publishing
on the Web...

...to creating, visualizing,
and analyzing
three-dimensional data...



...to street mapping
and address matching
for the entire
United States...

..and more, ArcView GIS extensions provide
the tools you need to get the job done.



ArcView® GIS

The World's Leading Desktop GIS™



1-800-447-9778

Fax: 909-307-3051

E-mail: info@esri.com

International: 909-793-2853,
extension 1-1235

For a demonstration or the location
of a reseller near you:
www.esri.com/partners

Choose 240 at www.pcmag.com/infolink

SOLUTIONS

TUTOR

Liquid Crystal Displays



Today's LCDs are bigger, faster, and brighter. We look at how they work and how designers are expanding the state of the art.

By Neil Randall

Liquid crystal displays (LCDs), common on notebooks and hand-held PDAs, are also appearing on the desktop. These flat-panel displays promise great clarity at increasingly high resolutions and are available in screen sizes up to 15 inches.

An LCD monitor offers benefits and drawbacks. The first benefit is size. Because of the need to house the tube itself, CRT monitors are big and heavy. LCD monitors are only a few inches deep, and they're much lighter. They also consume much less power than CRTs.

On the other hand, LCDs are considerably more expensive than CRTs, at least for now. Another problem is viewing angle. The optimal viewing angle of an LCD is from straight in front, and as you move further to the side the screen becomes harder to read, much more so than with a CRT. Furthermore, screen resolutions generally reach only as high as 1,024-by-768, insufficient for some applications.

LIGHT SOURCES AND VIEWING MODES

LCDs don't emit their own light as CRTs do. There are three viewing modes (see the diagram). In the *reflective* viewing mode, sunlight or room light enters the LCD from the front, hits a reflector and a polarizer at the rear of the display, and bounces back to the user.

Digital watches, calculators, and many other electronic appliances use reflective displays. But good ambient light is not always available, so other light sources and other viewing modes have been developed. Some LCDs are *edgelit*—the light source is attached to the side of the display panel—while most are *backlit*, with the light source behind the panel. The light source itself is typically one of three types: electroluminescent, light-emitting diode (LED), or cold-cathode fluorescent (CCF). Of these, electroluminescent is the most common for backlighting, while CCF provides the best edgelighting.

Aside from the purely reflective viewing mode, there are also the *transmissive* and *transflective* modes. The transmissive mode uses no reflected light, relying entirely on edgelighting or backlighting. The transflective mode uses reflected light when available and backlight when needed. Most notebook displays are transmissive, while personal digital assistants such as the Palm III are transflective.

THE STRUCTURE OF AN LCD

Liquid crystal molecules exist in a state between liquid and solid. The LC material can flow like a liquid, but the individual rod-shaped molecules can be given a specific orientation. LC molecules naturally line up in a more or less parallel configuration, like a string of pickets in a fence. This is called the *nematic* phase, so LCs used in displays are also

USER TO USER



Taming Microsoft Office Assistant animations; connecting a PS/2 port to a nonmatching motherboard connector; creating pseudo-random numbers in a batch file; naming an Excel 97 sheet from a cell; and more.

Page 315.

UTILITIES



DaysEase, this issue's free utility, lets you create and print monthly or yearly calendars in a variety of formats. You can add daily reminders, personalize your list of holidays, and modify the appearance of your calendar in a variety of ways. Page 327.

INTERNET USER



Cascading Style Sheets gave Web authors greater flexibility and precision in page layout. The latest specification, CSS-2, offers some valuable enhancements, including support for more media types and aural "display" capability. And CSS-2's visual rendering model keeps formatting and content separate, allowing you to make global changes easily. Page 333.

PC TECH

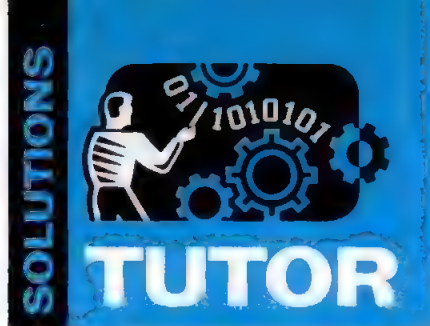


PC Magazine Labs introduces its latest benchmark tests: WinSton 99, WinBench 99, and 3D WinBench 99. You can download some of the tests, and they are all available on CD-ROM by mail. Page 351.

More on the Web:

You'll find all of the articles, examples, and code files in this section at PC Tech online.

www.pcmag.com/pctech



called *nematic liquid crystals*. The first step in LCD technology is to exploit this behavior by controlling the parallel alignment precisely.

The illustration below shows that an LCD is made up of several layers. The LC molecule layer is sandwiched between two *alignment layers*, which have tiny parallel grooves that align the molecules in a specific pattern. The grooves on one layer are perpendicular to those on the other. A spacer keeps the alignment layers at a fixed distance.

Because the grooves in the alignment layers are perpendicular and the ends of the strings of LCs align themselves along the grooves, the strings are *twisted*. In the most basic LC display, called *twisted nematic* (TN), this twist is 90 degrees. Advanced displays, called *supertwist nematic*, *double supertwist nematic*, and even *triple supertwist nematic*, twist the LCs up to 270 degrees. The greater the twist, the greater the potential contrast on the display.

The orientation of light is naturally random, but it can be made to follow a specific direction, in this case the twist of the LC molecules. The light in an LCD also passes through two *polarizing layers*, filters that admit only light that's oriented in a particular direction. These layers are arranged with their lines of polarization perpendicular, matching the corresponding alignment layers. If you simply put two polarizing layers together this way, light

would pass through the first and be blocked by the second, because the two light filters have perpendicular orientations. But the light in an LCD follows the twist of the LC molecules to match the orientation of the second polarizing filter, and therefore it can pass through.

The strings of LC molecules remain twisted until electrical current is applied to them, at which point they "stand up" in an end-to-end alignment, perpendicular to the plane of the display. The *electrode layers* supply current to selected areas. Those areas where current is applied appear dark, because the light—filtered through the first polarizing layer—follows the strings of standing LC molecules and is blocked by the second polarizing layer. Areas where the current is off appear light, because the light follows the twisted LC molecules and thus can pass through the second polarizing layer. The result is a system that blocks light in some places and allows it to pass through in others, forming an image.

To create color images, color filters are applied on top of the individual LCD cells. The filters typically are arranged in vertical stripes of

red, green, and blue, though other patterns are also used. To create a white pixel, three adjacent LCD cells are set to transmit light. Shades of colors can be created in different ways, including lowering the voltage applied to the LCD cell to reduce the amount of light transmitted, turning the cell on and off rapidly, and employing *spatial dithering*—using adjacent pixels to provide varying amounts of red, green, and blue.

PASSIVE VS. ACTIVE

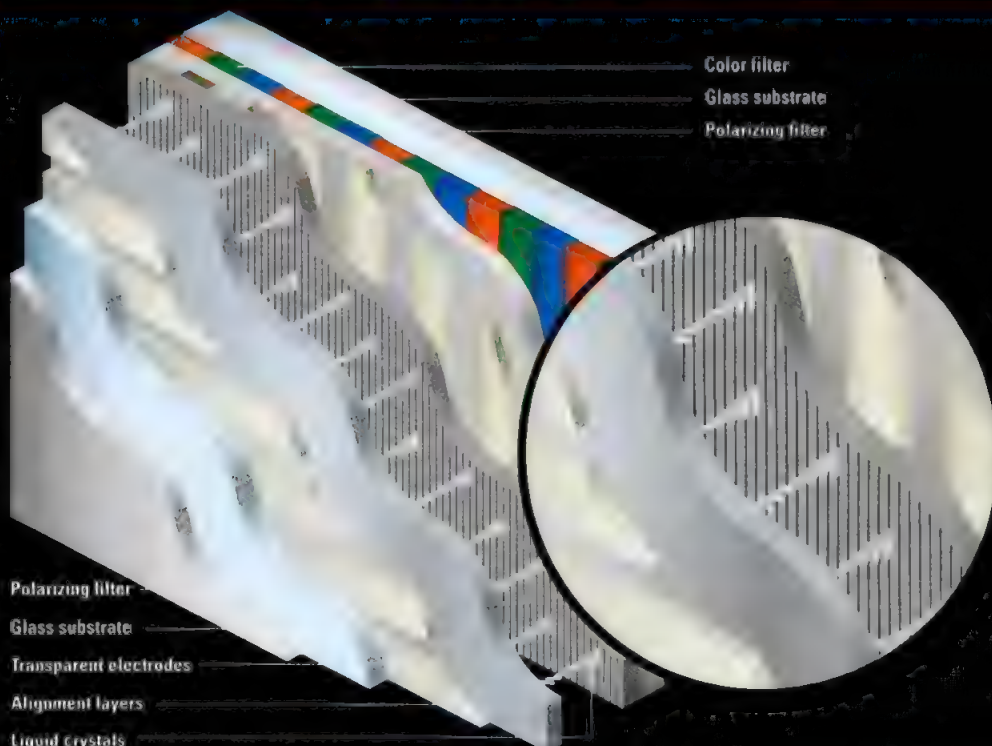
The most common distinction in LCDs used to be between *passive-matrix* and *active-matrix*, but more recently that distinction has been between *dual-scan* and *TFT* displays. Essentially, it's the same distinction.

A passive-matrix display relies on a grid of vertical and horizontal conductors, with individual LCD cells at each intersection. The controlling circuitry sends a current through each horizontal conductor in turn. If a pixel is to be turned off, the connection is opened with the corresponding vertical conductor, allowing the current to pass through the cell. This sequential addressing takes time and is one factor in the relatively slow response time of passive-matrix designs.

Dual-scan is an improved version of passive-matrix that refreshes faster by dividing the screen in half, with each half refreshed independently and simultaneously. Other passive-

HOW LCDs WORK

Light appears at the back of the display, either via a reflector (in reflective mode) or from an integral light source (in transmissive mode). A polarizing layer filters the light, which then passes through a glass substrate, a transparent electrode layer, an alignment layer, and then the liquid crystals (LCs) themselves. Complementary alignment and transparent electrode layers come next, then a color filter and another glass substrate. Each pixel in a color display is made up of red, green, and blue parts, in proportions determined by the logic that controls the LCs at each point on the transparent electrode grids. If the LCs are not electrically charged at a given point, the light passes through the front polarizing filter. If the LCs are charged, the light is blocked.



matrix technologies include CSTN (color super-twist nematic) and HPA (High-Performance Addressing), both of which are designed to offer higher response rates and better contrast.

The main focus over the past few years, however, has been on active-matrix technologies, also known as TFT (thin-film transistor) displays. These displays place at least one transistor at every pixel location, and these transistors control the pixels independently. Less current is needed to power the pixels, so the on/off time decreases, and the result is faster response and less or no ghosting.

TFT displays are much sharper and faster than passive-matrix displays, but they are also much more expensive to produce. The reason is easy to see: A screen resolution of 800-by-600 requires over 1.4 million transistors (800 times 600 times 3, with 3 representing the three colors), while 1,024-by-768 resolution requires over 2.3 million. As you might expect, there is no room for error, because if one transistor fails, that pixel is permanently off; therefore that screen location is permanently lighted. Some manufacturers build spare transistors at each cell, but this increases production costs.

The transistors also add to another problem: reduced light transmission. In any LCD design, a lot of the light is absorbed by the various layers, including the polarizers, the color filters, and the liquid crystal layer itself. In an

active-matrix panel, the transistor occupies a portion of the space directly above the liquid crystal cell, blocking still more light. The proportion of the active-matrix cell that is left open to transmit light is referred to as the *aperture ratio*, and LCD engineers are continually working to make this as large as possible. As panel resolutions increase, however, the number of transistors on the panel increases (and

TFT displays are much sharper and faster, but they are also much more expensive to produce.

more space is used up between the cells), blocking even more light.

As a result, most active-matrix LCD panels absorb 95 percent or more of the light they receive, even when displaying a white full-screen image. This in turn has serious implications for portable applications such as notebooks, where the amount of power required by the backlight affects battery weight and running time.

Manufacturers have come up with a range

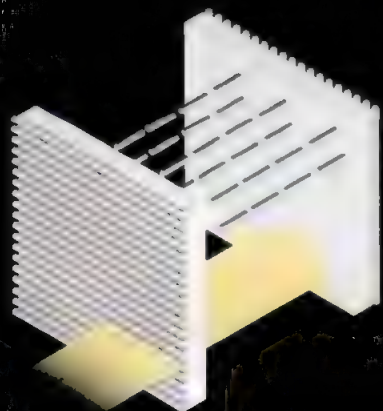
of advances to improve LCD performance. *In-plane switching* arranges the LCD horizontally instead of vertically, and this can greatly increase the horizontal viewing angle of a panel. Manufacturers are also working to come up with thinner LCD layers that will react more rapidly to current changes, giving the displays response times fast enough to display motion, as with movies.

Other LCD technologies continue to evolve. Ferroelectric crystals—which are permanently polarized—offer higher response rates and wide viewing angles, and some companies are developing systems with features of both active and passive displays. IBM recently announced the development of an LCD with a resolution of 200 pixels per inch, which to the human eye is no different from the look of a printed page.

There are also *bi-stable* LCD panels under development, in which cells will stay either on or off after the power has been turned off. This could have enormous implications for portable devices, because these displays may require much less power to maintain an image.

Many manufacturers are creating tiny LCD panels directly on silicon chips; these hold the promise of costing far less than the direct-view LCD panels used in notebooks and desktop monitors, and they can be used for portable projectors and in lightweight and compact rear-projection desktop monitors as well. **PC**

Light is filtered by a polarizing layer. Two alignment layers cause strings of rod-shaped liquid crystals, which naturally line up side by side, to twist 90 degrees. The light twists along the LC strings and passes through a second polarizing layer, which is offset 90 degrees from the first layer.



If the LC strings receive an electrical charge from the electrode layers, however, the molecules line up end to end, allowing light to pass straight through without twisting. In that case, the second polarizing filter blocks the light.



REFLECTIVE

Ambient light enters from the front, hits a reflector and a polarizer at the rear, and bounces back to the user. This type uses the least power.



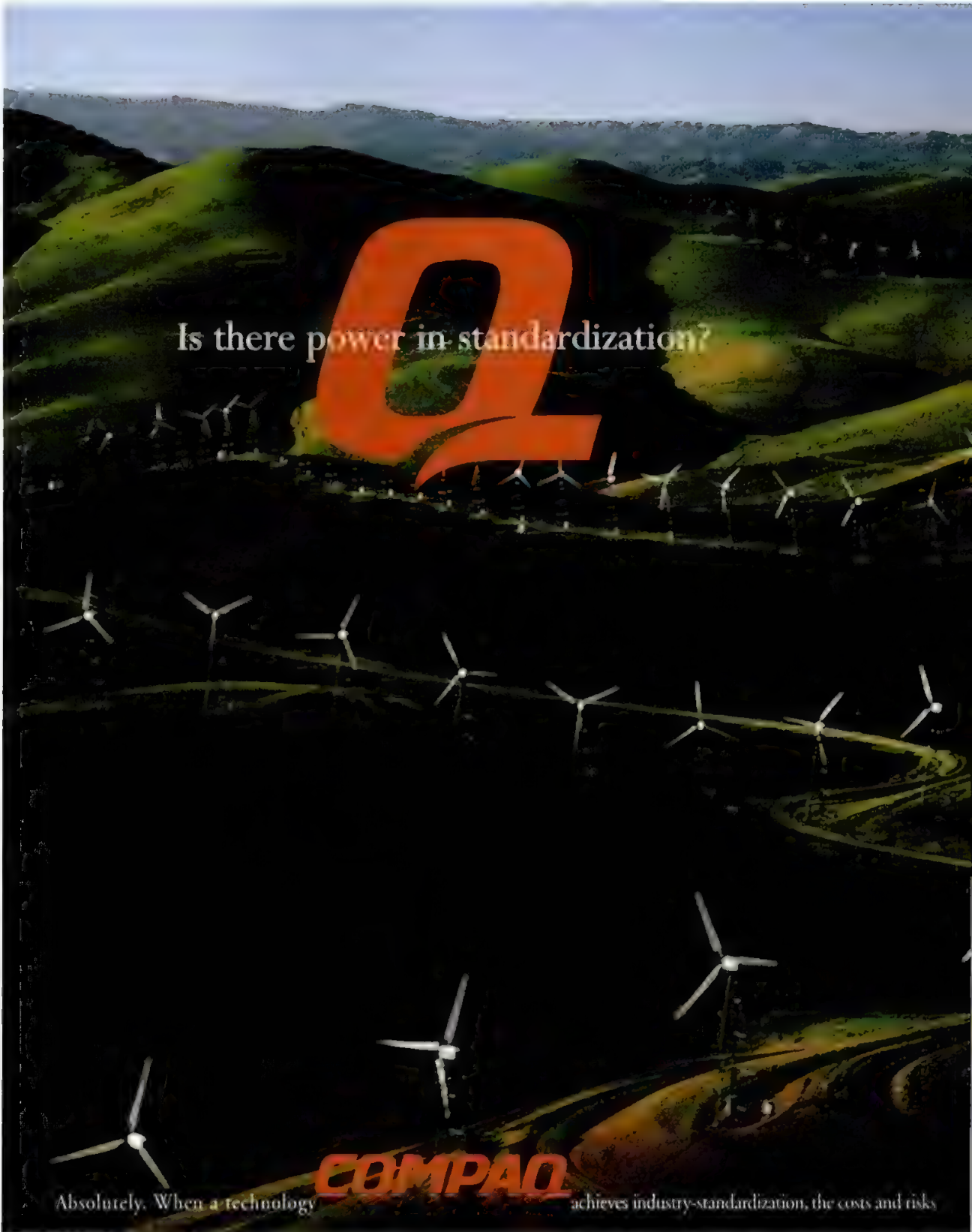
TRANSMISSIVE

This type uses no reflected light, relying entirely on edge lighting or backlighting. It consumes more power than the reflective type.



TRANSFLECTIVE

This type uses reflected light when available and backlight when necessary. In bright conditions, it uses no more power than the reflective type.



Is there power in standardization?

Absolutely. When a technology

COMPAQ

achieves industry-standardization, the costs and risks

best technologies—whether for one

PC, or an enterprise—and making them more useful

Better answers.™



of using it go down, and the number of people who can use it goes up. It's something we've long led the way in: taking the
and affordable for more people. For more answers, better answers, reach us at www.compaq.com/power or 1-800-AT-COMPAQ.



EasyCOMPUTING

for a new generation of PC users

**YES
YOU
CAN!**

★ **BUY LIKE
AN EXPERT**

★ **SURF
THE WEB**

★ **PLAY
GAMES
ONLINE**

★ **DESIGN
A KITCHEN**

PC
**a for
Everyone!**

From the Editors of
PC Magazine

Display until September 14, 1998
Summer 1998

WIN 98
A Visual Guide
To Your
New Operating
System

How to Buy
And Use
The New
Bargain
Computers

U.S. \$3.99 / CAN. \$4.99



(It doesn't get any easier than this.)

A LESSON IN SHARING

6

*Great reasons to share
your CD/DVD-ROMs*



Six great reasons to share CD/DVD-ROMs

on your network with AXIS StorPoint CD

1 *It'll do wonders for your bottom line*

You know how valuable CD-ROM content is — databases, sales data, reference materials, parts catalogs and much more. But when these resources are stashed away on a CD-ROM on somebody's desk, they're out of reach.

When you put CD-ROMs on the network, you get a lot more use out of them.

You can ensure that the CDs your users access are the same — and everybody doesn't need their own copy. No more out-of-date versions of key information. Now everybody can get to the same data, even at the same time. Just like data that resides on a file server.

At last, all of the data on all of your CD-ROMs is only a click away for all of your users.

2 *You can declare independence from your file server*

The traditional way of sharing CD-ROMs on a corporate network — the file server — means s-l-o-w performance. Just as it's inefficient to share printers using an application server, your file server can be overtaxed trying to manage access to an externally-attached CD tower. If your file server goes down, your CDs go down with it. So what do you have for all that expensive software?

With AXIS StorPoint CD, you attach CD towers directly to your Ethernet or Token Ring network. So you can literally be up and running, sharing CDs and DVDs across the enterprise in a matter of minutes.

3 *So reliable it'll make you a hero*

The benefits of sharing CDs are clear. But choosing the right connectivity platform from the right CD-ROM tower vendor can mean the difference between smooth sailing or getting tangled in a protocol and networking jungle.

Axis provides connectivity to most of the major CD-ROM tower vendors on the market. So no matter whose Axis-based product you buy, you can be assured thousands of companies on virtually every type of network have made Axis the tried-and-true solution.

4 *Easy for you*

Installing an AXIS StorPoint CD-ROM tower won't take you all day. All you need is an IP address and a physical connection to your Ethernet, Fast Ethernet or Token Ring network. That's it.

Whether you're in a Novell, NT, UNIX or Intranet/Internet environment, or running TCP/IP or SMB, your CD-ROM drives are on line in just a couple of minutes.

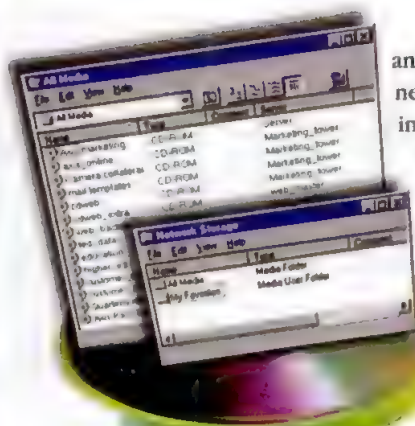
No software for any file server. No lengthy installation process. No parameters to set. It all happens automatically.

5 *Easy for your users*

Once your CD-ROMs are on the network, your users want to access specific CDs without hassles and without referring to a network roadmap.

Thanks to optional AXIS StorPoint DISCO client software, all CD/DVD-ROMs are only a mouseclick away. AXIS StorPoint DISCO automatically gathers





and presents all networked media in one convenient window — so your users simply point and click to open any CD, regardless of where it resides.

No more time wasted looking for CD or DVD titles on the network. No new interface to learn. AXIS StorPoint DISCO makes sharing multiple CDs across the enterprise — even hundreds of them — a breeze.

AXIS StorPoint CD is scalable with StorPoint DISCO, so your users can always find the CDs they're looking for, no matter how many reside on your network.

6 The backbone — ThinServer™

Axis' ThinServer Technology is the backbone of all Axis products, providing the capability to turn any CD/DVD-ROM drive into a network resource. ThinServer Technology is comprised of "thin" versions of the most popular network operating systems, Web management tools and Axis' own ETRAX 32-bit RISC processor — streamlined and optimized for device connectivity independent of any file servers.

And Axis makes sure you're always ready for new technology and new opportunities, with new product announcements, flash upgradable code and new releases that are available on the Web.



Complete Integrator Solutions

Axis is the top-ranked manufacturer of CD and DVD-ROM connectivity for 7- and 14-bay CD-ROM tower solutions.

Using the AXIS StorPoint CD, our many integrator partners provide a variety of complete tower solutions and service levels.

For a complete listing, see our Web site at <http://ads.zdnet.com/micro/axis>

AXIS StorPoint CD Helps Create Secure Information Availability

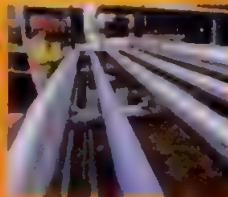
PanCanadian Petroleum's senior technology management analyst Jim Enjeneski seeks new, cost-effective ways to make information available. That's why he's become so interested in Axis Communications' StorPoint CD.

"I use AXIS StorPoint CD to distribute digital pictures and movies from my cameras," says Enjeneski. "These CDs are created on my desktop and then made accessible to anyone with a Web browser."

StorPoint's flexibility has helped Enjeneski build a new, secure information distribution capability at PanCanadian.

"I've produced temporary Web sites and placed them on a CD. StorPoint is then connected to the Internet, outside our firewall. Because CD is a nonvolatile medium, many of the security concerns of hosting a Web site have been eliminated," he notes.

"I place CDs containing conference notes on the StorPoint server and use my Netscape Compass server to index the entire CD content. So clients can search and find these CD publications."



Other uses for AXIS StorPoint CD are emerging at PanCanadian, too.

"A client can't hack into a StorPoint CD tower, so we use it to test unsecured communications services," says Enjeneski. "Testing an ATM connection or a line from our cable provider is made easier by plugging StorPoint directly into the router instead of a PC-type server or firewall. Then we can conduct basic performance and connectivity tests."

Sounds like Enjeneski and his colleagues have only just begun to find powerful ways to put the AXIS StorPoint CD to work.

SHARES WELL WITH OTHERS

{ one CD, one company, 300 employees, 6 platforms, 10 offices worldwide }

San Francisco

bob olsen –
North American
Sales Manager

A couple of clicks of the mouse and Bob finds the disk and pulls the sales data his boss needs. Thanks to Axis' ThinServer™ Technology, he doesn't even know the data was on a server in Stockholm. From his desktop, Bob has simple, one-point access to his company's AXIS StorPoint CD towers all over the world. Which is great, since his boss doesn't like to wait.

Stockholm

tony catlin – IT Manager

Same time, different time zone. Tony gets a call at home. Somebody reported a problem getting data from the CD-ROM tower in Stockholm. But Tony doesn't have to leave home because his networked CD-ROM tower has Axis' ThinServer Technology inside. With an Internet connection and his web browser, Tony fixes the problem with his kid on his lap.

kelli walton –
Marketing
Communications
Specialist

While Bob is doing his research, Kelli opens her "favorites" folder on her PC desktop and is instantly connected to the same disk on the same AXIS StorPoint CD tower in Stockholm. But Kelli doesn't know or care about that. She just knows she needs customer data for an ad campaign she's planning. Within seconds, she's got what she needs.

AXIS StorPoint™ CD is the simple solution for networking CDs and DVDs.

No more looking around for CDs and DVDs. No more waiting your turn. Now with StorPoint, CD/DVD-ROMs can be shared quickly and easily by multiple users around the world or down the hall. Our ThinServer-based AXIS StorPoint CD is now used in virtually all premier CD-ROM towers, such as the Procom Technology CD Tower E2. Ask if it's inside the tower you're thinking about buying.

Learn more about AXIS StorPoint CD and how it simplifies the way you do business. Visit our website today to take advantage of several opportunities: You can register for our seminar series on ThinServer Technology, sign up to become an Axis Beta Test Driver, register to win **FREE** product, and more.

<http://ads.zdnet.com/micro/axis>

AXIS
COMMUNICATIONS



Procom Technology's E2
with Axis inside



David Carson
Graphic Artist
New York, NY
The original
concept designer for
Raygun magazine.
The End of Print and
2nd Sight are two
books about his work.
Favorite Web Site:
sidewalk.com
Monitor of Choice:
Samsung's new 900p



The 900p
The newest member
of Samsung's family of
SyncMaster™ monitors
19" FST (18" viewable)
Resolutions up to
1600 x 1200 @ 75Hz
Drop-down panel



THE NEW SKETCH PAD

MY MONITOR IS HOW I COMMUNICATE

"I'm self-taught, so I never learned what I'm not supposed to do. I learned to rely on intuition — as a way of working, it's an artist's most important tool. Intuition makes you step inside yourself. It incorporates the artist, makes the work more personal — it prompts experimentation. I want to be able to see what I'm thinking, quickly. Samsung's new 900p

monitor is the best I've found. The color, the resolution and the fidelity give me more solutions with the clarity and accuracy I need to see. Rapid Viz (rapid visualization) is crucial. I used to sketch my ideas, but now, my monitor and my intuition are where and how I start." For more information, call 1 800 so simple or visit our web site at www.sosimple.com

© 1998 SAMSUNG ELECTRONICS CO., LTD. ALL RIGHTS RESERVED. SAMSUNG, SYNCMASTER, AND THE SAMSUNG LOGO ARE TRADEMARKS OF SAMSUNG ELECTRONICS CO., LTD. IN THE U.S. AND OTHER COUNTRIES. RAYGUN, THE END OF PRINT, AND 2ND SIGHT ARE TRADEMARKS OF DAVID CARSON. PHOTO: ARNOLD



Best 5-Star
Product of the
Year in Category
Jan. 1998 - Dec. 1998



Best Product of
the Year 1998
Jan. 1998 - Dec. 1998



Editors' Choice
Jan. 1997 - Dec. 1997



Aug. 1996 - Dec. 1996
Sept. 1995 - Dec. 1995



Oct. 1997 - Dec. 1997
Oct. 1996 - Dec. 1996
Sept. 1995 - Dec. 1995



Monitor Partner of the Year
1996 - 1997



June 1997 - Dec. 1997



Play 1997 - Dec. 1997



Aug. 1996 - Dec. 1996



Feb. 1997 - Dec. 1997
July 1996 - Dec. 1996
May 1996 - Dec. 1996

Critical company data on your servers is at risk of loss...

...and guess who they'll come to when it happens?

It's no secret who they'll come to. Protecting the critical data on your servers is your job. And what happens when vitally important files are accidentally deleted from the server BETWEEN backups? Simple: those files are gone forever – unless you have UNDELETE® file recovery for Windows NT®, with up-to-the-minute data loss protection.

Saves time and money—improves productivity

You won't find a system manager that hasn't experienced losing valuable data sometime, somewhere. Whether it's a CEO's speech, critical database information or company financials, the consequences can be almost unbearable. UNDELETE provides the only safe and reliable solution, built from the ground up for Windows NT 4.0, to give you instant access and file recovery with a just a few clicks of a mouse. Now, your safety net will be complete, while gaining the ability to recover files anywhere on the network—without leaving your desk—and without the hassle of having to spend hours hunting through backups.

- **EXCLUSIVE!** UNDELETE gives you an immediate file recovery solution for files accidentally deleted and lost between backups or during faulty backups
- **EXCLUSIVE!** Captures all deleted files that bypass the NT Recycle Bin (including files deleted over the network, Command Line, or from within a program).
- **EXCLUSIVE!** Easily restores files over the network and those deleted from shared drives.
- **EMERGENCY UNDELETE™** (on CD) lets you recover files even if you haven't loaded the program yet, to prevent overwriting the data you just lost!

Backups—time consuming and not 100% reliable

The time has come for a complete solution for your Windows NT system. Using UNDELETE eliminates the missing link in your data protection system and keeps your most valuable asset, your data, from being at risk.

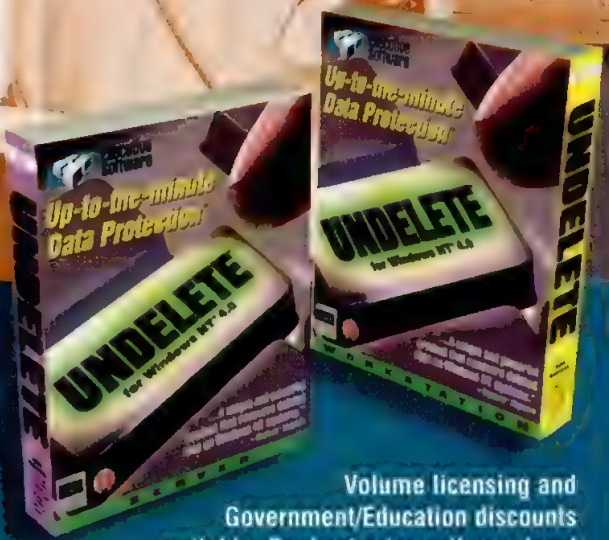
User error and accidental deletes aren't going to go away, but now you know you're able to get everything back anyway!

Just UNDELETE.

www.undelete.com/info

Free 30-day trialware download

Des. and dev. for
Microsoft®
BackOffice®

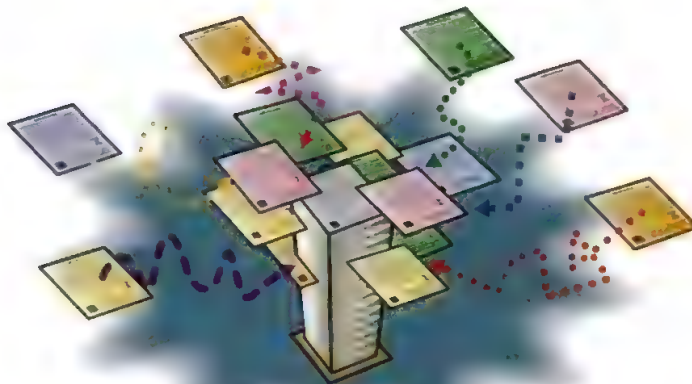


Volume licensing and Government/Education discounts available. For best price call your local Reseller or call 1-800-829-6468.

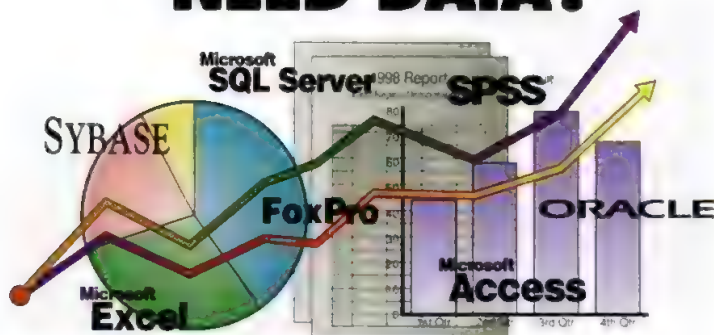
 **Executive Software**
www.undelete.com



GOT FORMS?



NEED DATA?



GET **TELE**form.

AUTOMATED DATA ENTRY FROM CARDIFF SOFTWARE.

If you've got forms and need fast access to information, there is only one answer—TELEform™ the total data collection solution.

Award-winning TELEform is a powerful family of programs that read data from faxed, scanned, or even Internet-based forms. Time cards, sales orders, surveys, patient billings—any form in every format. With its sophisticated, Tri-CR™ multi-engine recognition technology, TELEform interprets handprint, typed characters, check marks, bubbles, bar codes—any data—and automatically sends that information into databases, spreadsheets and many other business applications.



Whether you have 100 or 100,000 forms, you can have the information you need to make smart business decisions—without waiting for someone to manually key in data.

Thousands of organizations rely on TELEform to streamline data entry operations. Contact Cardiff Software today to find out how you too can reduce data processing costs, improve data entry accuracy and accelerate your access to vital information.

For more information or to arrange a live demo in your office, call today.

1-888-254-8915

www.cardiffsw.com

Cardiff Software



1782 La Costa Meadows Drive • San Marcos, CA 92069
Tel: 760.752.5244 • Fax: 760.752.5222 • 800.659.8755 • <http://www.cardiffsw.com>

Choose 177 at www.pcmag.com/infoLink

TELEform and Tri-CR are trademarks of Cardiff Software, Inc. Microsoft, Excel, Access, FoxPro, and SQL Server are trademarks or registered trademarks of Microsoft Corporation. All other trademarks are property of their respective holders. Tri-CR includes technology licensed from Advanced Telecommunications Technologies, reRecognition GmbH and others.

TeleVideo does it again! Optimized value and performance.

Visit us at
Fall COMDEX
LVCC Booth #2458



SVP 350
October 1997



SVP 350
May 1998
July 1998
September 1998



Look for finely crafted monitors with crisp, sharp color and vivid images from TeleVideo. We have provided you with optimum performance and value since 1975. Best of all, every monitor is protected by our exclusive TeleXPRES, a 3 year warranty and 72-hour replacement service.



To find out more about TeleVideo CRT and LCD monitors, call 800-835-3228 ext. 474. Or visit our website at www.televideoinc.com. Of course, you can also go see for yourself at your local reseller.

**72-hour replacement offer applies to the first 30 days of warranty only. Call TeleVideo for details and restrictions.

©1998 TeleVideo, Inc. The TeleVideo name and logo are registered trademarks. Images copyright ©1998 Photodisc, Inc.

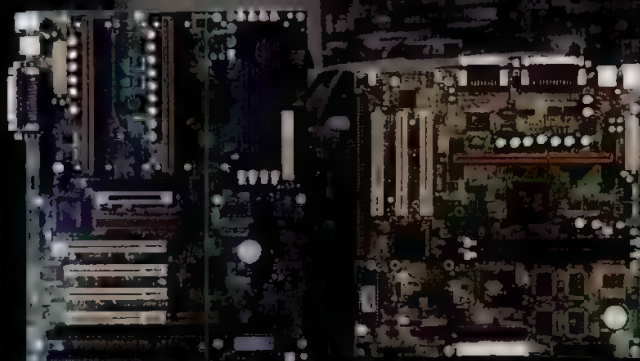
 **TeleVideo®**

Vision To Succeed

Choose 019 at www.pcmag.com/infolink

A-TREND

Shows you the Direction



ATC-6260 440BX DP SCSI M/B ATC-6510 440EX Micro ATX M/B

A-TREND
A-Trend Technology

Pentium II M/B

Video product

Audio product

Voodoo 2 Edition

A-Trend Technology provides a wide range of solutions for PC integration: mainboards, VGA cards, sound cards, DVD peripherals, Net Computer, etc. With ISO 9002 quality assurance, Microsoft PC '97 / Windows 95 system approval, FCC and CE certifications, A-Trend Technology provides you with compatible, quality, and reliable products for your total PC solution.

PC'97
Approval

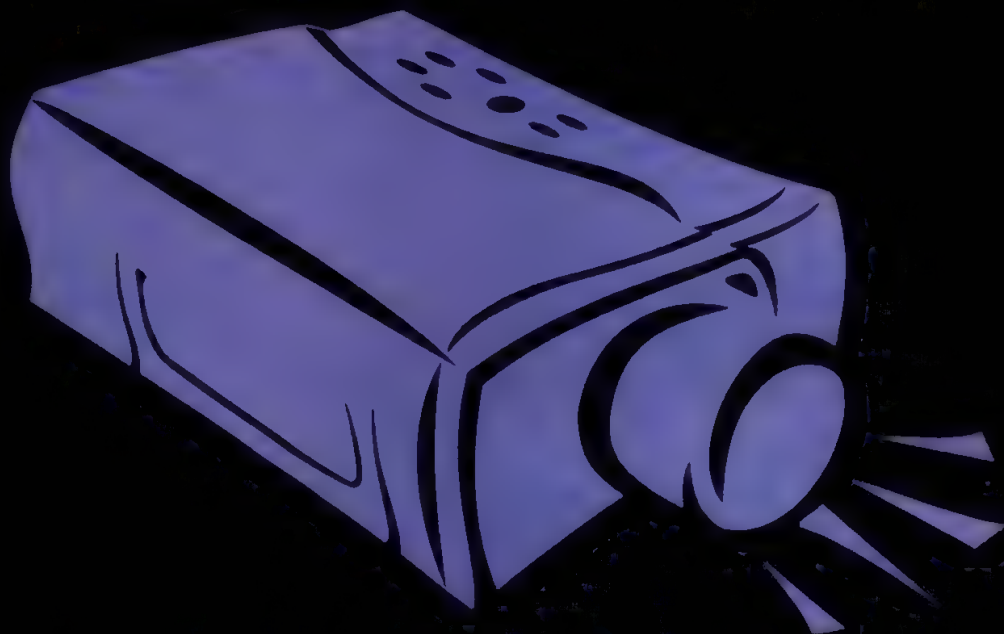
ATC-6120 ATC-6220
ATC-6130 ATC-6030



All brand and product names are trademarks or registered trademarks of their respective companies. Products and specification are subject to change without notice.

Choose 056 at www.pcmag.com/infolink

Portable Presentation Power



Made Affordable

The **EzPro 680** - the Brightest and Lightest

CTX Opto leads the market for affordability in true XGA, LCD projectors. It's not just a better price, but a more powerful, light-weight projector that comes standard with a deluxe soft/hard case and full accessories for mobile presentations. As with our full line of projectors, the EzPro 680 comes with the industry's best warranty and it is always available for a *free demo*.

Call CTX Opto or visit our website at www.ctxopto.com

Visit our booth #3357 at INFOCOMM.

June 11-13th.

Model	Resolution	Weight	Power	Features	Standard Warranty
CTX Opto EzPro 680	1024 x 768	5.00	17 lbs.	yes	2 years
airwave EzPro 700	1024 x 768	4.00	12 lbs.	no	1 years
Comet Powerlight 700	1024 x 768	4.00	14.5 lbs.	no	1 years
Phoenix 800	1024 x 768	5.00	14.1 lbs.	yes	1 years



Choose 128 at www.pcmag.com/infolink

CTX Opto, Inc.

1-888-942-2929 x400A

The CTX Family of Mobile Presenters:



EzPro 700
Advanced DLP



EzPro 600
High Performance



EzPro 580
Metal Halide



EzPro 550
Affordable SVGA

Don't you
have more
important
things to do
than wait
on line
at the
Post Office?

You need a **Personal Post Office**™

In a business world where time is money and image is everything, the new Personal Post Office™ gives you everything you need. You'll never go out for stamps again because postage refills by phone in under 30 seconds with total security. And you'll never use too much postage again because the electronic scale eliminates wasted postage. You can even add your own promotional message to ensure your customers and prospects open *your* mail immediately. And despite its big features, the new Personal Post Office™ fits on a corner of your desk!

Look At All You Get For 90 Days Free!

- * Pitney Bowes Personal Post Office™
- * Electronic Scale
- * Business-building direct mail CD-ROM



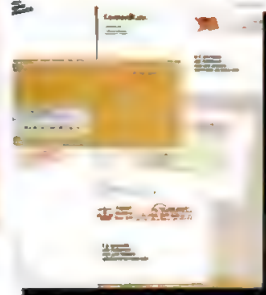
1. Weigh envelope on electronic scale for exact postage



2. Insert envelope and admire instantly metered mail



3. Print a sales message or logo



4. Meter envelopes, flats and packages!



Limited time offer, so call now!

1-800-5-PITNEY Ext. PBPM

www.pitneybowes.com/soho

Mailing made simple™



Pitney Bowes



Personal Post Office



Says Who?

In the red-hot world of IS/IT, you have to keep proving your expertise to get ahead. While you and your peers might consider yourself an expert at what you do, if, after years of on-the-job training, putting out fires, and being an all-around hero hasn't helped you slide up the staircase and reap your just rewards, perhaps it's time to get Microsoft-certified. It's the sure way to show those powers that be that you've absolutely got what it takes to keep their systems running.

ViaGrafix Training Videos and Multimedia CBT help you master the software you need to get ahead.

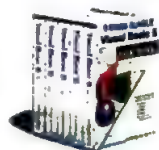


Windows NT 4 Training Series

8 Videos or
8 CD-ROMs

\$299.95

**OTHER PROGRAMMING
COURSES AVAILABLE**



Visual Basic 5 Tutorials

5 Videos or
5 CD-ROMs

\$199.95



Visual C++

5 Videos or
5 CD-ROMs

\$199.95



Access 97

4 Videos or
4 CD-ROMs

\$159.95

Windows NT 4 MCSE Training Series

12 Videos or
12 CD-ROMs

\$599.95



"As a Certified Electronic Technician and an independent computer consultant, I am always looking for ways to get the competitive edge. The ViaGrafix MCSE video and CD-ROM training system is the best way I have found to help me attain my goal of network certification... [I] would not hesitate to recommend ViaGrafix as a complete source to provide computer training to anyone."

Bill Dol Jr.

Bill Dol Jr. C.E.T.

CALL TODAY TO GET STARTED TOWARDS

MCSE CERTIFICATION AND THE REWARDS THAT COME WITH IT!



ViaGrafix

800/842-4723

tel: 918/825-6700 fax: 918/825-6744 or 800/842-3294 email: sales@viagrafix.com

NASDAQ: VIAX

www.viagrafix.com/winNT

OVER 800 TITLES AVAILABLE. CALL US!

©1998 ViaGrafix. Prices subject to change without notice.

H-6012-8

Triple Standards.

INDUSTRY-LEADING FIVE-YEAR WARRANTY

Performance.

Reliability.

Value.

► New Impression
19 Inch monitor:
9 VX
0.22 mm H-dot pitch
96 KHz H-Scan

New Impression
17 Inch monitor:
Vienna Pro 75
0.25 mm stripe pitch
96 KHz H-Scan
Award-winning
DiamondTron™
Technology



Performance.

Consider the time you spend staring at a computer monitor... you'll want the highest performing monitor in your price range. Impression monitors give you the clearest, and most vivid images available. That's because Impression's advanced image-enhancing circuitry produce pinpoint electron accuracy for crisp images and text. Do away with distortion. Impression's ultra-high refresh rates produce flicker-free images that virtually eliminate eye-strain and eye-fatigue.

Reliability.

Our manufacturing facilities are ISO certified. That means we meet or exceed the world's strictest international quality assurance standards. And if that's not enough, your monitor investment is protected with a 5 year warranty on parts, 3 years labor and 3 years on CRT. We've been in the monitor business since 1989, and we plan to stick with our customers for a long time. To support your needs, Impression offers 24 hours-7 days a week technical support. Can't afford any down-time? Impression guarantees defective monitor replacement within 48 hours.*

Value.

Impression monitors offer serious quality and features you'd expect from a more expensive brand. Features like micro-processor-based digital on-screen controls, MPRII low radiation compliance, and EPA energy-saving functions. And, we incorporate award-winning CRT technologies into our monitors like Hitachi's Hi-Contrast, Toshiba's Microfilter, and the ultra-vivid DiamondTron technology from Mitsubishi. Whatever your business application may be, Impression is your affordable display solution. So if you're buying a new computer, or upgrading to a larger screen size, insist on performance, reliability, and value from your computer dealer or manufacturer. Insist on the Impression standards. Call 1888-532-7878 for the nearest reseller.

MODEL	9 VX	VIENNA PRO 75	7VX
CRT	19" HI-CONTRAST	17" D AMONTRON	17" HI-CONTRAST
DOT PITCH (MM)	0.22 Horizontal	0.25 A.G.	0.26
VIEWABLE AREA	18.0"	16.1"	15.0"
H-SCAN (KHZ)	24-96	24-96	30-96
MAX. RESOLUTION	1600x1200	1600x1200	1600x1200
OPTIMUM RESOLUTION	1280x1024 @ 75 Hz	1024x768 @ 85 Hz	1024x768 @ 85 Hz

MODEL	TVXL	7V	5V
CRT	17" MICROFILTER	17" S-MASK	15" S-MASK
DOT PITCH (MM)	0.26	0.27	0.28
VIEWABLE AREA	16.0"	16.0"	13.8"
H-SCAN (KHZ)	30-70	30-70	30-70
MAX. RESOLUTION	1280x1024	1280x1024	1280x1024
OPTIMUM RESOLUTION	1024x768 @ 75 Hz	1024x768 @ 75 Hz	1024x768 @ 75 Hz



Impression TV



Impression 5 VXL



Impression 7 Plus

Touch Screen
Models
Available



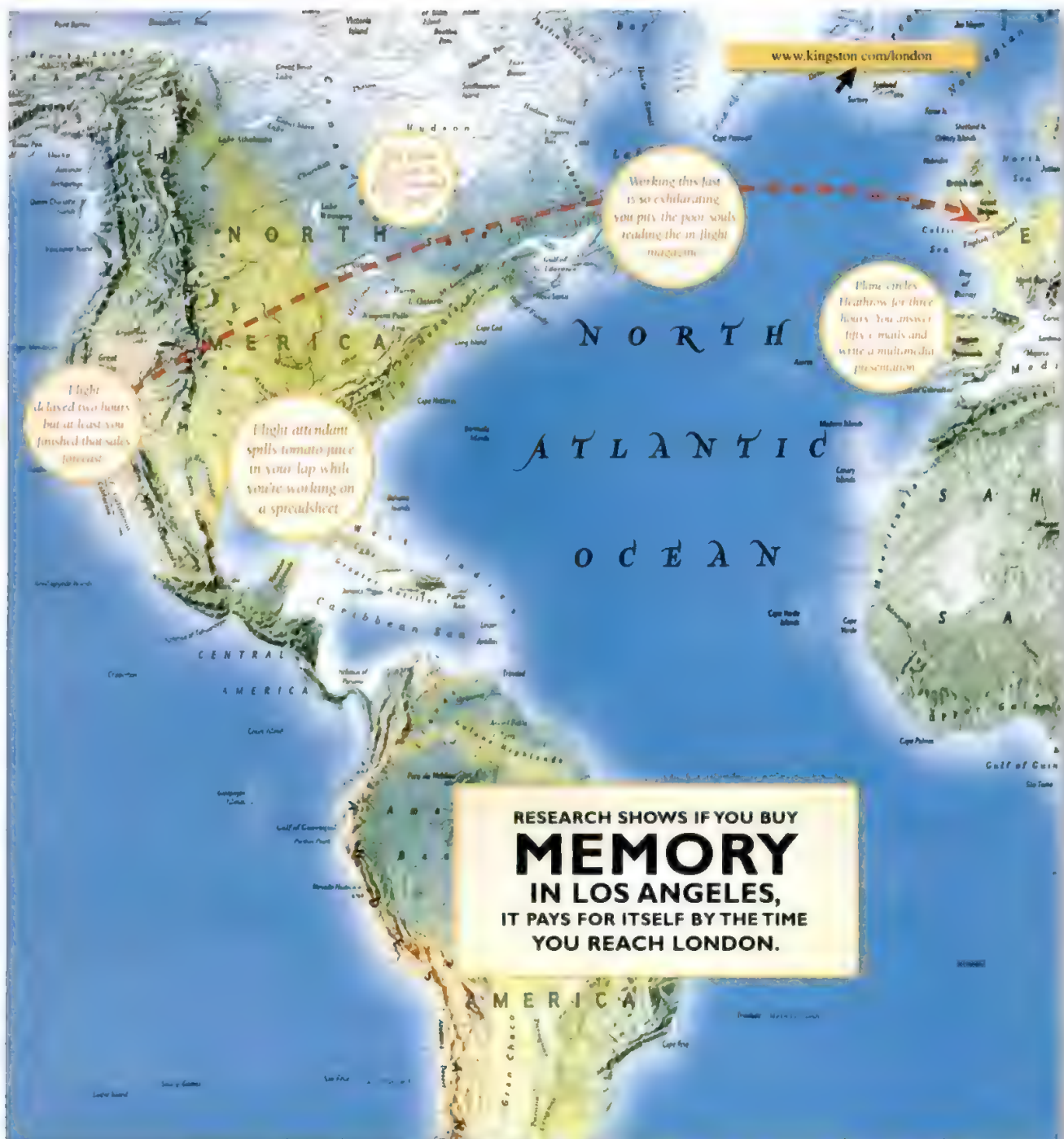
Distributed by
INGRAM MICRO

Call Your
Local Computer
Reseller

Impression is a registered trademark of Impression Products, Inc. Hitachi Hi-Contrast is a registered trademark of Hitachi. DiamondTron is a trademark of Mitsubishi Corporation. Microfilter is a trademark of Toshiba. All other trademarks belong to their respective owners. 3 year parts, labor, and 2 years CRT for Impression Plus series. Other warranty policies may apply to other models. *Certain restrictions apply. Excludes weekend and holidays. Copyright 1998 Impression Products, Inc. 1585 Redwood Way, Fremont, CA 94539

Impression

To Become an Impression Reseller, call 510-497-8900 or visit www.Impression-brand.com
Choose 263 at www.pcmag.com/infolink



THE MOST SATISFYING TRAVEL UPGRADE isn't from coach to business class. It's a Kingston® memory upgrade for your notebook PC. Want proof? A recent PC Computing® report showed that a basic memory upgrade makes managers 38% more productive*—so productive it pays for itself in one day or less, depending on how you use your system. Of course, reliability is critical too. That's why Kingston

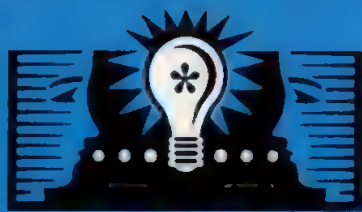
memory is customized to the requirements of the systems in which it will be used. For added measure, we throw in a lifetime warranty. That's why more Fortune 500® companies choose Kingston memory. To see our new low pricing on memory for the leading notebooks, call your Kingston reseller. Or call (800) 337-8420. With what you save your company, you may never have to fly coach again.

Kingston
TECHNOLOGY
COMPUTING WITHOUT LIMITS®



* PC Computing's "Upgrades That Pay" at zdnet.com, April 1998. Kingston Technology Company, 17600 Newhope Street, Fountain Valley, CA 92708 USA. (714) 435-2600. Fax (714) 435-2699. © 1998 Kingston Technology Company. All rights reserved. All other trademarks and registered trademarks are the property of their respective owners.

PC Magazine Choose 106 at www.pcmag.com/infolink



USER TO USER

Deanimating the Office Assistant

I've recently upgraded to Office 97 and find I have a problem with the Office Assistant. Quite simply, the animation and sound are too distracting for my taste. Is there a way to kill this animated annoyance?

Marvin James
Palatine, Illinois

PC You actually have several choices for eliminating the Office Pest...uh...Assistant, depending on whether you want to tone it down or kill it off altogether.

To get rid of it completely, which will return Word help—and indeed all of Office help—to the behavior you're used to from older versions, find the Office\Actors directory. By default, this is on drive C: with the full directory path Program Files\Microsoft Office\Office\Actors, but it could be elsewhere. If necessary, you can find it by choosing *Start | Find | Files or Folders* and entering *.act as the item to search for. This will find the files with .act extensions in the Actors directory.

Once you've found the directory, use Windows Explorer to move to that directory and create a new subdirectory; I'll call it ActFiles. (In Windows Explorer create a new directory with *File | New | Folder*.) Then move all the files with .act extensions to the ActFiles directory.

After you finish this bit of surgery, the Office Assistant will be gone. Starting the next time you load Word (or other Office programs, for that matter), whenever you hit F1 or choose the equivalent menu command or toolbar button, you'll see the *Help* dialog box alone. You can then search for help as in

earlier versions. If you ever change your mind, getting the Office Assistant back is as simple as moving the ACT files back to the Actors directory.

The drawback to this approach is that it not only eliminates the Office Assistant's distractions but also eliminates the natural-language help system. If you want to keep the help system but make the Assistant as unobtrusive as possible, click on the Assistant, choose *Options*, and check or uncheck the options as you like. Uncheck *Respond to F1 key*, *Display alerts*, *Make sounds*. Make sure there are no checks in any of the *Show tips about* or *Other tip options* choices, but leave the *Move when in the way* check box checked.

These choices will tone down the Office Assistant considerably. You can also make the Assistant's window smaller by dragging any corner. Note too that the gallery of Assistants you can choose from include some that are less animated than others. To change the Assistant, right-click on the Assistant, choose *Choose Assistant*, and then use the *Back* and *Next* buttons to scroll through your choices.

The least active choice shipped with the program is the spinning Office Logo. To pick it, scroll to it and choose *OK*. If the file isn't already on your disk, you'll get a message asking you to put your Office CD in your CD-ROM drive.

If you want to eliminate the animation altogether, you can download the Quiet Office Logo from Microsoft. The file is *Tofflogo.exe*. At this writing, you can find it by going to www.officeupdate.microsoft.com/index.htm#updates and browsing through the list. Look in the Word section for *Office Assistant: Quiet Office Logo*. This is also the place to go if you have the opposite problem—that is, you can't get enough Office Assistant. Here you can download many more animated helpers. You can choose among puppies, robots, a dolphin, Mr. Einstein, and cats to assist you (see Figure 1). Microsoft changes its URLs with some regularity, so you may have to start at the highest level, at www.microsoft.com, and search for this Office Update/Download page.

But if you just want to tone down the Assistant, once you've downloaded the Quiet Office Logo file, run it to install the Office Assistant. You can then change the Assistant to the one labeled Office Logo Absolutely No Moving Parts, by right-clicking on the Assistant. —M. David Stone

Mismatched Mouse Maker

I purchased an internal cable to provide a mouse PS/2 port connection to my Pentium II motherboard last weekend, but I realized when I got home that the socket does not match the pins on my motherboard. The socket on the cable has seven holes (a two-by-four configuration with one hole filled with a plastic plug), but my motherboard's mouse connector has five in-line pins with this pinout:

Pin	Signal
1	Mouse data
2	Not connected
3	Ground (GND)
4	+5 Volts DC
5	Mouse clock

Is there a different standard mouse PS/2 port cable with a five-pin connector to the motherboard that I can get? If so, where should I look for one? What is the pinout for the mouse connector? My new cable has four wires going to its connector, and maybe I can rewire it with a connector for the motherboard.

Jim Brazill
via the Internet

PC There is precious little standardization on motherboard-connector layouts and configuration, aside from the obvious floppy disk and IDE ports. In the future, the best bet is to get a connector provided by the motherboard manufacturer. In the meantime, you may be able to make do with what you have.

The first step is to find an in-line connector that will fit the pins on your mother-



FIGURE 1: The top Office Assistant is a completely stationary logo, while Kairu the dolphin and Professor Einstein can amuse you with gestures and actions.

How to Contact Us

Send your tips and questions to our advisors in any of the following ways:

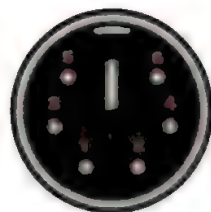
E-MAIL: pctech@zd.com **FAX:** 212-503-5799 **MAIL:** User-to-User, PC Magazine, One Park Avenue, New York, NY 10016-5802
(Please send a floppy disk and a printout.) **COMPUERVE:** To reach individual editors as listed on ZDNet, type GO PCMSTAFF.

If we print your tip, you'll receive \$50 plus a PC Magazine T-shirt.
We regret that we cannot answer letters individually.



board. If it has wires already connected, so much the better; cut off the PS/2 mouse port from the connector you purchased, and splice the appropriate wires together. The pinout for the six-pin connector used by a PS/2 mouse port (see diagram) corresponds directly to the pin assignments on your motherboard:

Pin	Signal
1	Mouse data
2	Not connected
3	Ground (GND)
4	+5 Volts DC
5	Mouse clock
6	Not connected



If you're not entirely certain about which wire is attached to which pin on the connector, use an ohmmeter (or circuit-continuity tester) to find out which wire is connected to which pin.

Now, all of this will take some time and perhaps another trip or two to the electronics parts store. A new part for your motherboard would probably cost from \$10 to \$15, so depending on how much your time is worth to you, you may just order the correct part and chalk the extra expense up to experience.

—Alfred Poor

Random Numbers In a Batch File

Thanks to your utility LogoMania, I was able to create several different Windows 95 start-up logo files to add variety to my system. I added a few lines to my Autoexec.bat so that different files would appear each time I started up. But I was unable to get DOS to start the different Logo.sys files randomly. Can you please tell me how to do this?

Eugene Toh
via the Internet

PC Even full-scale programming languages don't generate truly random numbers. Instead, they use an internal calculation that takes the current "random" number value and uses it to generate a new number. The calculation is devised so that there's no obvious pattern in a series of these pseudo-random numbers. Each number is based on the previous number, and the random-number generator is initially "seeded" using the system time.

The complicated calculations needed to generate a series of random numbers are beyond the abilities of the batch language. However, if you need just one more-or-less

random number, you can take it from the hundredths-of-a-second value in the system time. Figure 2 shows an example batch file that gets the hundredths-of-a-second into two environment variables, rand1 (containing just the last digit) and rand2 (containing both digits).

To use this batch file for random Logo.sys file selection, first delete the line that ECHOes the random numbers. Assuming you have ten or fewer files, name them 0.Sys, 1.Sys, 2.Sys, and so on. Then in Autoexec.bat include lines like these:

```
:Loop
CALL random.bat
IF NOT EXIST %rand1%.sys GOTO Loop
COPY %rand1%.sys logo.sys
```

If you have from 11 to 60 files, simply give them two-digit filenames, and use the environment variable rand2 instead of rand1.

—Neil J. Rubenking

```
@ECHO OFF
IF NOT '%1'=='' GOTO GET
ECHO. | TIME > random1$.bat
ECHO SET time=%~3>current.bat
CALL random1$.bat
DEL current.bat
ECHO;; |CHOICE/S/C;%time%; %0
>random2$.bat
:: If the time is 1:23:45.67p, then
:: random2$.bat will contain the
:: line: "random [;.1.;.2.3.;.4.
:: 5...6.7.p.;]?"
random2$
```

```
:GET
pause
SHIFT
IF '%1'=='' GOTO END
IF NOT '%1'=='. ' GOTO GET
SET rand1=%3
SET rand2=%2%3
ECHO Random numbers: 1-digit=
%rand1%, 2-digit=%rand2%

:END
DEL random?$.bat
```

This batch file uses the hundredths-of-a-second value from the system time to derive a pseudo-random number.

Naming an Excel 97 Sheet From a Cell

I would like to have a sheet named after a cell in my Excel 97 worksheet. For example, if cell A1 has the label *January*, I'd like the sheet name to match.

Nick Felton

Sydney, Australia

PC It would be nice if you could simply double-click a worksheet tab, then write a formula such as =A1 to assign the contents of A1 to the worksheet tab. Unfortunately, Excel doesn't permit this. If you put =A1 on the sheet tab, the name of your worksheet becomes =A1. You can, however, write a macro that assigns the value of A1 to the Name property of the current worksheet. And you can make this macro event-driven, so that any change to A1 triggers execution of the macro. The code in Figure 3 should do the trick.

In Excel 97, press Alt-F11 to display the VBA Editor. From the *Insert* menu, choose *Module*. Then enter the code in the new module window. (Note that the lines that begin with n= should be entered as single lines, not broken the way they are in Figure 3.)

After you've entered the code, double-click the entry for your first worksheet in the Project Explorer window. (The Project Explorer window is the window that shows an outline of your current project. Normally it appears in the upper-left corner of the VBA Editor's display. If you don't see it, press Ctrl-R. In the outline, you should find the heading *Microsoft Excel Objects*. Subordinate to that, you'll find an entry for each sheet in your workbook.)

After you double-click the entry for your first worksheet, you'll see two drop-downs at the top of the VBA Editor's code window.

One will say (*General*), the other (*Declarations*). In the first drop-down, choose *Worksheet*. In the second, choose *Change*. Now the following lines appear in the code window:

```
Private Sub Worksheet_Change
    (ByVal Target as Range)
End Sub
```

Between these two lines, type the following:

```
If Target.Cells(1, 1) = Range("a1")
Then UpdateSheetName
```

Repeat these steps for each additional sheet in your workbook whose name you want to be equal to the content of A1.

The *Worksheet_Change* procedure, which is





At These Prices, How Can You Not Make A Smart Move?



pentium® II

Compaq Armada 1592 Notebook

- Pentium® processor with MMX™ technology 233 MHz
- 12.1" High-Contrast TFT Display
- 32 MB SyncDRAM
- 3.2 GB¹ Hard Drive
- 20X² CD-ROM Drive
- 56K Modem³
- Microsoft® Windows® 95

\$1399 **reFURBISHED**

Compaq Presario 5610

- Pentium® II processor 350 MHz
- 64 MB SyncDRAM
- 8.0 GB¹ Hard Drive
- DVD-ROM Drive⁴
- 56K Modem³
- 100 MB Iomega® ZIP BUILT-IN™ Drive
- Microsoft® Windows® 98
- Special price, monitor sold separately

\$1399 **reFURBISHED**

Compaq Presario 4640

- Pentium® II processor 266 MHz
- 48 MB SyncDRAM
- 4.0 GB¹ Hard Drive
- DVD-ROM Drive⁴
- 56K Modem³
- 512KB L2 Pipeline Burst Cache
- Microsoft® Windows® 95
- Special price, monitor sold separately

\$769 **reFURBISHED**

Compaq Deskpro 6000

- Pentium® II processor 300 MHz
- 32 MB ECC SDRAM
- 24X Max⁵ CD-ROM Drive
- 3.2 GB¹ UltraSCSI Hard Drive
- Compaq Netelligent Network Controller
- Microsoft® Windows NT® 4.0
- Special price, monitor sold separately

\$799 **reFURBISHED**

Diversified Product Selection

- Refurbished - tested by Compaq's
- Excess New - Compaq's excess inventory
- With the lowest prices in the industry

Business or Pleasure?

- Compaq's new 15" and 17" monitors
- Compaq's new 15" and 17" monitors
- Compaq's new 15" and 17" monitors

Compaq Refurbished Rewards

- 10% off on all Compaq products
- 10% off on all Compaq products
- 10% off on all Compaq products

www.compaqworks.com

Supplies Are Limited. Call Today.
1-888-202-4326



COMPAQ WORKS

Your Compaq Factory Outlet for
Quality and Savings

All Compaq products sold at Compaq Works are refurbished unless otherwise noted. Our selection of refurbished products includes customer return units, evaluation units, cosmetically blemished products and older discontinued products. All refurbished products are retested at Compaq where replacement of components is made, if necessary, to bring the product up to fully functional condition. All refurbished products carry a 90-day limited warranty and may be returned to any Compaq Authorized Service Agent for service. All excess new products carry the Compaq Standard Limited Warranty. For a complete copy of our warranties, please stop by or write Compaq Works, 10251 N. Freeway, Houston, TX 77037. Product availability limited to products on hand. All prices are Compaq Works prices and do not include tax. Prices subject to change. ¹For hard drives, GB=billion bytes. ²20X CD-ROM drive data transfer rates may vary from 1300 to 3000 Kbps. The K56flex protocol is designed only to allow faster downloads from K56flex compliant digital sources. Maximum achievable download transmission rates currently do not reach 56 Kbps and will vary with line conditions. ³This drive will not read CD-R media. ⁴24X Max CD-ROM drive data transfer rates may vary from 1500 to 3600 Kbps. Compaq Computer Corporation shall not be liable for technical, pictorial or editorial errors or omissions contained herein. Compaq, Presario, Deskpro and the Compaq logo are registered in the U.S. Patent and Trademark Office. Armada is a trademark of Compaq Computer Corporation. Pentium and the Intel Inside Pentium II processor logo are registered trademarks and MMX is a trademark of Intel Corporation. Microsoft, Windows, and Windows NT are registered trademarks of Microsoft Corporation. Other product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. © 1998 Compaq Computer Corporation. All rights reserved. FCM1298



triggered automatically whenever a change is made to the worksheet, returns an object called `Target`. The value of `Target` is the range that has been changed. The line you insert between the `Sub` and `End Sub` statements says that if the upper-left corner of `Target` happens to be cell `A1`, Excel should run the `UpdateSheetName` macro. (Note that if you just write `If Target = Range("a1")`, you'll get a `Type Mismatch` error if you make a change to a multicell range.)

Now let's take a look at the `UpdateSheetName` macro itself.

The main business of the macro is to assign the value of cell `A1` to a variable named `n`, then assign `n`'s value to the `Name` property of the worksheet. Because Excel imposes some restrictions on worksheet names, however, the macro has to do a little extra work.

Worksheet names are limited to 31 characters. Therefore, instead of putting all of `A1`'s contents into the variable `n`, the macro uses the `Left` function to get only the leftmost 31 characters. Thus, if `A1` is a long label, the `Name` property gets a truncated version of `A1`.

Because worksheet names cannot be blank, the assignment of `A1`'s value to variable `n` takes place within an `If-Then-Else` structure. If `A1` isn't empty, the assignment occurs. If `A1` is empty, an input box notifies you that the name can't be null and prompts you for a valid name. Thus if you erase the contents of `A1`, the macro lets you type a new name. The same thing happens if you delete `A1` and the cell that moves into `A1`'s place is empty. If you'd rather the macro simply retain the current name under these circumstances, simply delete the `Else` line and the line that follows it. If you do this, erasure of `A1` causes the macro to quit with-

out changing the sheet name.

Finally, a sheet name is invalid if it duplicates an existing sheet name or includes certain illegal characters, such as slashes or brackets. The macro traps these kinds of invalid names by means of an `On Error` statement and an error-handler routine. If `A1` contains anything that can't be truncated to a valid sheet name, an input box prompts the user for a new name.

—Craig Stinson

Insisting on a Four-Digit Year

Microsoft Access 97 lets you choose from among several different date formats, but none of them use four-digit years. How can I display a date field using a four-digit year and force users to enter dates that way too?

Curtis Streetman
Brooklyn, New York

PC You can use the field's `Format` property to force the display of all four digits in the year. For example, changing the `Format` property to `mm/dd/yyyy` does this. If you don't set this property, Access displays `Date/Time` fields in `General Date` format, which is a combination of `Short Date` and `Short Time` as specified in the `Regional Settings` applet of the `Control Panel`. Because `Short Date` in the `Control Panel` defaults to two digits for the year, and because the year 2000 is fast approaching, specifying a `Format` property with a four-digit year seems an especially good idea.

Change the `Format` property of the date field in `Table Design` view (select the table, choose *Design*, select the field, and then edit the `Format` property, shown under *Field Properties*). When you set a date field's `Format` property, Access uses that format to display the date in datasheets and also copies the property forward to new controls on forms and reports. For forms and reports that already exist, you will have to set the `Format` property explicitly for each control that

has your date field as its control source.

Access offers a lot of flexibility in the way you enter dates, so I'm usually reluctant to force date entry in a particular style. For instance, if the year is 1998 you can enter *12-Dec*, *12-12*, *12/12*, or *12/12/1998* and Access will convert the entry to December 12, 1998, and store that in its internal date/time format.

As soon as you tab out of the field, Access paints the date using the `Format` property or, if no `Format` property value exists, using the `Control Panel` setting, so the feedback is immediate. You may want to consider relying on the `Format` property to show users what they've entered. You can further validate the date by setting the `Validation Rule` property or by placing code in the `After Update` event. If you must force a particular input format, you can use an input mask.

An input mask lets you create a fill-in-the-blanks input template that automatically displays parentheses, dashes, and other standard delimiters. When you create an input mask, you use special characters to tell Access what type of text is allowed and whether the data is required or optional. For example, to specify that a date must be entered in `mm/dd/yyyy` format, you would set the field's `Input Mask` property to `99\99\9999;0;_`. For more details on what these characters mean and on creating custom input masks, see "InputMask Property" in the Microsoft Access 97 help.

As with the `Format` property, you should set the `Input Mask` property of the date field in `Table Design` view, then set the `Input Mask` property of any control on an existing form or report that has your date field as its control source.

When working with the `Format` and `Input Mask` properties, you must be aware that Access processes them in the light of the `Regional Settings` applet in the `Control Panel`. That is, if the value in one of the properties is inconsistent with the `Control Panel` setting, Access ignores the property. *Consistent* in this context means the given format can be displayed in the given input mask. For example, a `Control Panel` setting of `mm/dd/yy` would not work with an input mask of `99-LLL-99`, so the input mask would be ignored.

You should try changing the `Short Date` format specified in the `Regional Settings` applet of the `Control Panel` so that it includes four digits in the year. This will impact every application that references this setting, however, so be prepared to change it back if problems occur. One example: Display fields sized for only two-digit years will not be wide enough to display a date with a four-digit year correctly.—Sal Ricciardi **PC**

```
Sub UpdateSheetName()  
    On Error GoTo ErrorHandler  
    If ActiveSheet.Range("A1") <> Empty Then  
        n = Left(ActiveSheet.Range("a1").Value, 31)  
    Else  
        n = Left(InputBox("Cell A1 is blank. What  
name do you want to give this sheet?"), 31)  
    End If  
    ActiveSheet.Name = n  
    Exit Sub  
ErrorHandler:  
    n = Left(InputBox("Invalid name! Enter a name  
that is not already in use and that does not have  
one of the following characters:" & Chr(13) &  
Chr(10) & Chr(10) & ": / \ ? * [ ]"), 31)  
    Resume  
End Sub
```

This Excel 97 macro assigns the value of `A1` to the `Name` property of the current worksheet.

With Premio's Titan Servers, Getting Connected Has Never Been Easier

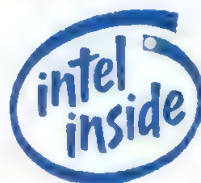


Are your servers and PCs Novell®, WindowsNT®, & Windows® 95/98 certified? Are they Year 2000 compliant? If not, take a look at our Titan 4800 Intel®-based server, with the Intel® Pentium® II Xeon™ processor 400 MHz. These servers come with the latest processor technologies and outstanding horsepower. Together with our equally impressive desktops, we can get you connected in a wide range of network environments. All PREMIO® products are manufactured in our ISO-9002 certified facilities. We offer direct manufacturers' pricing together with intimate, local and responsive support from our 7 branches and 1000 resellers nationwide. Our products are 100% built to your specifications and needs, and we offer 3-year limited standard warranty. Give us a call today or go to our web site at www.premiopc.com/pcmag.



Net perfect

- High-quality servers, PCs, videoconferencing equipment, and more.
- Year 2000 compliant
- Numerous federal and state contracts (GSA, CMAS, Satellite Contract, State of Georgia, Ohio State Term Schedule)
- Elaborate certifications including Novell®, WindowsNT®, Windows® 95/98
- ISO-9002 certified facilities
- Excellent pricing, 9 years of experience
- Comprehensive support and service from 7 branches and 1,000 resellers
- 3-year limited warranty (on-site service plans and upgrades available)

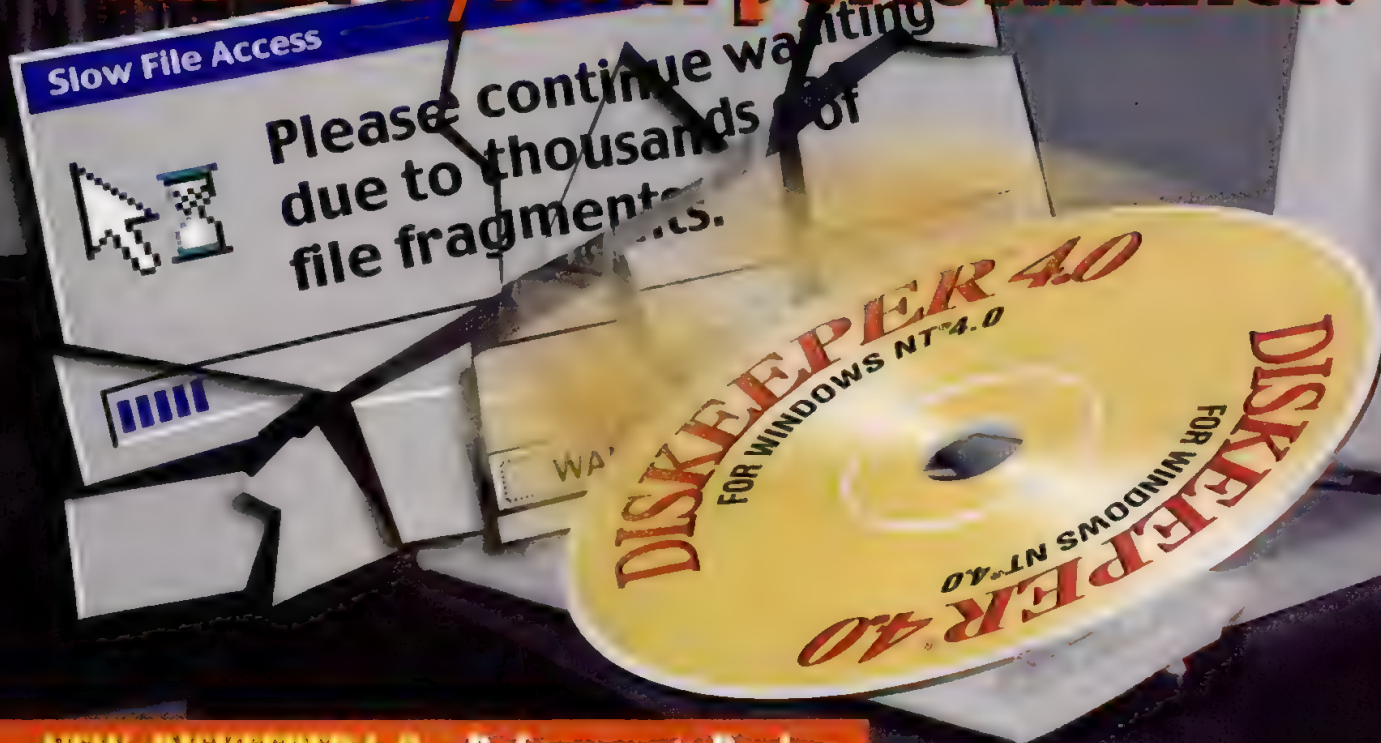


pentium® II
xeon™
PROCESSOR

©PREMIO 1998. PREMIO® and the PREMIO® logo are registered trademarks of Premio Computer, Inc. Intel, the Intel Inside Logo and Pentium are registered trademarks and Pentium II Xeon is a trademark of Intel Corporation.

800-677-6477
www.premiopc.com/pcmag

Major breakthrough in faster system performance!



NEW: DISKEEPER 4.0 — Defragments Paging Files for Unparalleled System Speed!

Files are commonly shattered into hundreds or even thousands of fragments. A file that has 200 fragments takes two hundred times longer to access. A file with 200,000 fragments takes 200,000 times longer and so on—slowing your system to a fraction of its potential speed. DISKEEPER for Windows NT has consistently set the standard for eliminating this primary performance bottleneck. And now, *new* DISKEEPER 4.0 provides exclusive technology that allows you to defragment the Paging File, creating the most complete, cutting-edge defragmentation solution available anywhere!

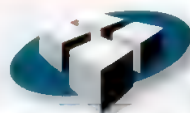
- **NEW!** Defragments the **PAGING FILE** at boot time.
- **EXCLUSIVE!** Consolidates and defragments Directory Files.
- **EXCLUSIVE!** Remotely schedules, monitors and controls defragmentation across the network.
- **EXCLUSIVE!** "Set It and Forget It" auto-scheduling options.
- Group scheduling for groups of Windows NT systems—or even entire domains with just a few clicks. (Server version)
- 100% safe and completely compatible with your existing Windows NT 4.0 system.

Stop WAITING and get performance gains you can actually see! Download a trialware copy of the new DISKEEPER 4.0.

Volume licensing and Government/Education discounts available. For best pricing call your local Reseller or call 1-800-829-6468.

Why **BUY** a non-network defragmenter for Windows NT 4.0 when **DISKEEPER LITE** does a better job for **FREE!**

Download: www.diskeeper.com



Executive Software
www.execsoft.com

701 N. Brand Boulevard, 6th Floor
Glendale, CA 91203-1242

Copyright © 1998 Executive Software, Inc. All rights reserved. DISKEEPER 4.0 is a registered trademark of Executive Software, Inc. in the United States and other countries. Microsoft, Windows NT, and the Windows logo are trademarks of Microsoft Corporation. All other trademarks are the property of their respective owners.

Choose 211 at www.pcmag.com/infolink

"Disk fragmentation can cause performance problems. You should consider running a defragmentation program on a regular basis."

— Microsoft Windows NT Server Resource Guide



www.diskeeper.com/dkinfo



POWER PRINTING.



microLaser™ 400

Print Speed: Up to 40 pages per minute

Duty Cycle: Up to 300,000 pages per month

Paper Input: 1,500 sheets std. up to 11" x 17"; plus 3,000 sheets opt.

Interfaces: Ethernet and parallel

Opt. Interfaces: IBM 5250 Twinax, IBM 3270 Coax, SCS, IPDS

Std. Features: Duplexing, internal hard disk drive

Year 2000 compliant

**PRODUCTION
PRINTING UP TO
300,000 PAGES
PER MONTH.
NETWORK-READY!**

Do you need a network laser printer that races through your most demanding production applications? Meet GENICOM's microLaser 400. This powerhouse is perfect for high-volume production jobs such as month-end reports, batch printing and other mission-critical applications. Every detail of the microLaser 400 is designed for production printing, from long-lasting consumables to large paper handling capacity. The result? Low cost of ownership, with outstanding performance and durability. Which is exactly what you'd expect from the company that's been building high-performance midrange printers for more than 25 years. Call GENICOM today for more information. Mention "power" and receive a free gift.



GENICOM
www.genicom.com

WHEN THE PROS TESTED THE NEW HITACHI MONITORS, THEY LIKED WHAT THEY SAW.

"One 19-inch unit, the SuperScan Elite 751, distinguished itself from the others great test scores"
PC Magazine

"SuperScan Pro 800 is a true bargain... solid scores... terrific price"
PC Computing

"The Elite 802's image is solid in all respects, all the way up to 1800 x 1440... excellent performance at a reasonable price"
Catalyst

"SuperScan Elite 751 led the pack... delivers the same high-end image quality expected of the manufacturer. 1997 Product of the Year"
Imaging

"The best image available... SuperScan Elite 751"
Computer Shopper

"Our top 21-inch monitor... SuperScan Elite 802 had the best image quality... and its price is low"
Byte

"Best buy SuperScan Pro 500 displays razor sharp text and graphics... very crisp text detail, accurate color graphics quality, terrific low price"
PC World



When you're looking for a monitor, pay attention to what you hear as well as what you see. Because the pros — people who test monitors for a living — like the new Hitachi SuperScans. They've been very clear in saying so.

They like SuperScan's clean, sharp images and accurate color detail. The fact is Hitachi has always been strong in high-end, big screen displays. Today, our 17 and 15 inch displays (various viewable image sizes) are winning solid acclaim as well.

So whatever size monitor you're looking for, listen to the pros and check out the new Hitachi's. Call for the full story and the location of your nearest retailer.

USA: (800) 441-4832. Canada: (800) 906-4482

SuperScan®



CDW
800 544 4239
800 544 4239

CompUSA
800 1-800-441-4832
800 1-800-441-4832

ComputAbility
800 441-4832
800 441-4832

Computer City
800 441-4832
800 441-4832

800 441-4832
800 441-4832

PC Connection
800 441-4832
800 441-4832

800 441-4832
800 441-4832

PC Zone
800 441-4832
800 441-4832

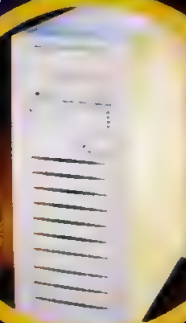
HITACHI



Vista II NT Server



Cosmos II NT Server



Orion NT Workstation



APRI-80 Desktop



Get power-packed Windows® NT performance when you connect with DTK.

The DTK line of state-of-the-art Windows® NT desktops, workstations, and servers can provide you and your business with the price/performance difference for today's critical networking technology.

Our top-of-the-line Vista II NT server features four Pentium® II Xeon™ processors 400MHz, the advanced

450NX chipset, up to 4GB of EDO memory, and six hot-swap LVDS SCSI hard drive bays.

The Cosmos II NT server features dual Intel® Pentium® II processors 450 MHz. The Orion NT workstation is configured with up to dual Intel® Pentium® II Xeon™ processors 450MHz. And, the APRI-80 desktop is powered by

an Intel® Pentium® II processor 450 MHz.

Now add 24x7 reliability, easy network management and support for leading enterprise applications. No matter the business environment, DTK has the better NT solution. Call 1-800-BUY-A-DTK (1/800-289-2385) or contact sales@dtkcomputer.com

DTK Computer
www.dtkcomputer.com



COMDEX Fall '98 Booth# Sands Expo S2777

Boston
617/932-3800
Indianapolis
317/546-8805

New York
732/562-8800
Milwaukee
414/679-7870

Washington, D.C.
703/222-9194
Minneapolis
612/557-1973

Atlanta
770/279-1385
Kansas City
913/492-3800

Miami
305/597-8888
Dallas
972/484-8535

Pittsburgh
412/373-6750
Houston
281/568-6688

Cleveland
440/349-1995
Scottsdale
602/451-6774

Chicago
847/593-3288
Sacramento
916/446-7969

Detroit
248/926-9134
Los Angeles
626/810-0098

Intel, Intel Inside Logo and Pentium are registered trademarks and Pentium II Xeon is a trademark of Intel Corp. Windows is a registered trademark of Microsoft Corp. © 1998 DTK Computer, Inc.

Choose 372 at www.pcmag.com/infolink

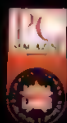


ASUS

6300 Series

A risk-free investment for your portable life. The grateful upgradeability with exchangeable modular devices ends rebuying process you used to deal with rapid computing technologies. Its delight global award winning history stands for the quality and reliability.

- 13.3" XGA TFT ● Intel® Pentium® II Processor 300 MHz to Pentium® Processor With MMX Technology 233 MHz ● 32MB SDRAM expandable to 144MB ● 2MB EDO RAM Graphics Accelerator
- HDD up to 8GB ● Removable 24X CD-ROM, exchangeable with DVD-ROM, FDD, or LS-120
- Thermal Dissipation System
- 12 cells Li-Ion battery up to 5 hours ● 8.4 lbs.



Notebook TRIO!

Succeeding the successful P6300, ASUS is grandly to introduce the new Grandio and Allegro notebook series. Now the choices are more dynamic. From screen size, processor speed, storage drive, memory capacity, to design, it's your own selections to build a personal machine that fits all your usage criteria. That's why you will have comfort in knowing that you are satisfied, when choosing ASUS.

Grandio

A powerful partner that delivers all the excitement you have wished for, including superior 14.4" screen, active 3D AGP image, lively DVD performance, and dual batteries. The premium solution for software engineering, extensive analysis, graphic designing, and ultimate gaming.

- 14.1" XGA TFT ● Intel® Pentium® II Processor 300/266 MHz ● 32MB SDRAM expandable to 288MB ● 4MB SGRAM 3D Graphics Accelerator
- HDD up to 8GB ● 56K V.90 Fax/Modem
- Removable 24X CD-ROM, exchangeable with DVD ROM, 2nd HDD, or 2nd battery pack
- 9 cells Li-Ion battery up to 3.5 hours ● 7.0 lbs.

Allegro

The notebook with a different tempo. For people on the go! Simple, sleek, but compact which loaded with every essential application. An excellent and economical choice for frequent business travelers, corporate, and small.

- 13.3" XGA or 12.1" SVGA TFT ● Intel® Pentium® II Processor 266 MHz to Pentium® Processor with MMX Technology 233 MHz
- 32MB SDRAM expandable to 180MB
- 2MB SGRAM Graphics Accelerator
- HDD up to 8GB ● 56K Fax/Modem
- 24X CD-ROM or DVD-ROM
- 9 cells Li-Ion battery up to 3.5 hours ● 6.2 lbs.



Visit our booth in the Comdex



Distributor: ASI 1-800-2000-ASI
Merisel 1-800-MERISEL
TechData 1-800-237-8931
Website: www.asus.com
Toll free TEL: 1-800-746-8761

ASUS:



The Intel Inside and Pentium are registered trademarks and MMX is a trademark of Intel Corporation

PIECE TOGETHER YOUR COMPANY'S NETWORK BASED ON WHAT? PICTURES?



You know your network. You know the pieces that make up that network.

And you may have

pictures of those pieces in the form of network diagrams, but they lack the critical data you need for making solid decisions. Introducing NetworkCharter™ Pro from Micrografx, a revolutionary graphical toolkit that will change the way you dis-

cover, document, and design your company's network.

Only NetworkCharter Pro incorporates data-driven diagrams that place real-world network devices, specs, reports and configuration intelligence at your fingertips. Its object-oriented database gives you graphics and vitals on over 10,000 vendor-specific network devices, with over 600 available data fields and as many as 50 pre-defined attributes per device. You

can even add the intelligence you need to your existing Visio® network diagrams.

NetworkCharter Pro's wide variety of reporting options and automatic, non-intrusive discovery functionality go one step further to deliver a complete solution. With NetworkCharter Pro, suddenly all the pieces come together to form a whole that makes much more sense.

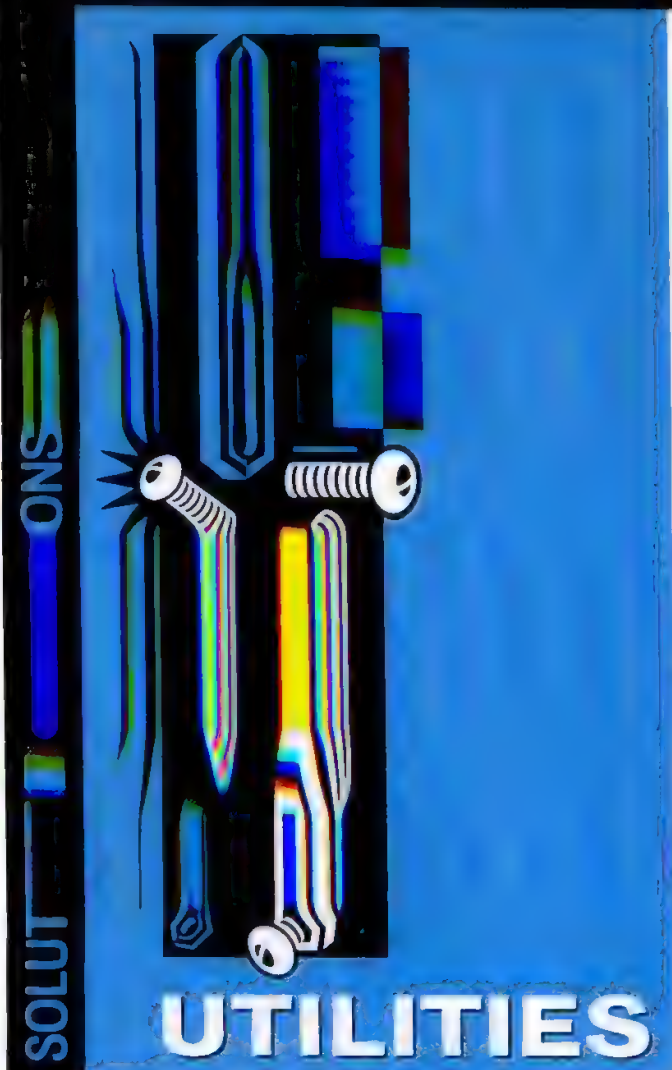


MICROGRAFX®
Intelligent Graphics • Work

VISIT WWW.MICROGRAFX.COM/PCMA TO REQUEST YOUR FREE 30-DAY TRIAL CD-ROM.

For more information, call (800) 998-0153. © 1998 Micrografx Incorporated. All rights reserved. Micrografx is a registered trademark and NetworkCharter is a trademark of Micrografx Incorporated. Visio is a registered trademark of Visio Corporation.

Choose 070 at www.pcmag.com/lnfolink



Create Custom Calendars with DaysEase

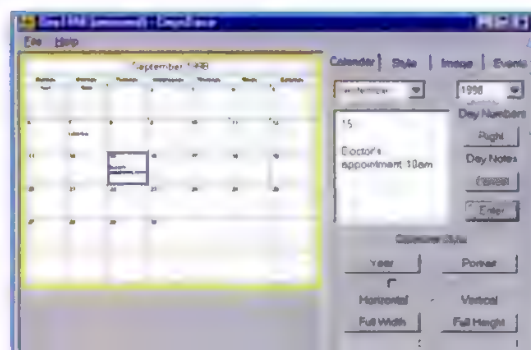
DaysEase makes printing custom wall calendars or monthly calendars of activities simple. Its flexible interface lets you position and resize a calendar and an image of your choice just about anywhere, on any size of paper supported by your printer. You choose the fonts for each of the different elements on the calendar.

Add and edit holidays, birthdays, anniversaries, or any recurring events you like. You can even specify events for calcu-

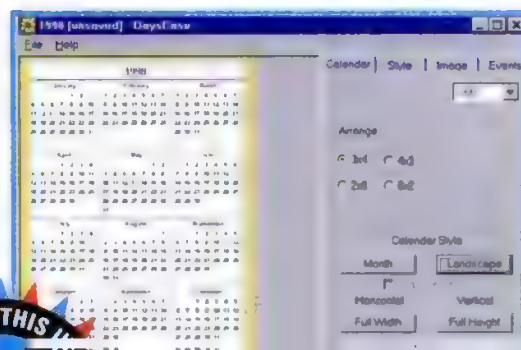
lated dates, such as the third Sunday of each month. Quickly enter daily notes, appointments, or your vacation itinerary, and print the month out easily.

An article about how to use DaysEase and how it was programmed is available at www.pcmag.com/download.

Richard A. Ellingson, the author of DaysEase, is a sysop for ZDU and ZDNet on the Web. Sheryl Canter is editor of the Utilities column and a contributing editor of PC Magazine.



The DaysEase "Day Notes" feature lets you add daily reminders to monthly calendars.



You can also create yearly calendars in a variety of formats. The Style page lets you set the fonts and title.



Find no less an \$13.95 a month, plus 25-3 connections per hour, to buy. Eighty megabytes of disk space give you mega-capacity. Guaranteed 99.9% uptime gives you superior reliability. And our 24x7 toll-free line gives you the best support in the business. Clearly, all web hosting companies are not the same. Let Interland® bring you the world.

Special Promotions Available
interland
Web Hosting
www.interland.net

Pricing From \$19.95 per Month

- 99.9% guaranteed uptime (or the month is free)
- 80 megabyte storage
- Unlimited e-mail accounts for your website
- 100MB of space with transcripts and accounting
- Free website design and hosting service
- Free domain AT & T support
- Active Server Pages & ODBC support
- 24x7 Server support for UNIX and NT
- Automatic WebTrends (no software required)
- Secure Server
- Realtime logs including incoming URLs
- UNIX and NT based Web Servers
- Easy Web based configuration of your website
- Real-time & 24-hour technical support
- 24x7 support
- Dedicated and Dedicated Servers
- Support for installing a commercial system (including Redhat, Mandrake, SuSE, etc.)
- Mercantec, Open Market, Hot Metal Pro, and more)

1-800-599-0548
(404) 586-9999

**Best
Reseller
Prices.**



believe in technology **ZD**



Call for Help,
weeknights, live @ 7pm EST

Y'know that little help icon on your computer? Now it's an entire TV network.

This is ZDTV.™ The new 24-hour television network devoted to computing, the Internet and all the possibilities. Lively, fast-paced, energetic shows that help you get the most out of your computer. Like "Call for Help,"™ the call-in show that helps you with your computer problems, from loading software to the best way to get on the Internet. And then there's our web site, www.zdtv.com, where you can get breaking computer news, in-depth analysis, and live chat with the show hosts. So watch ZDTV. It's the icon of the future of television.

**To request ZDTV, call your cable or satellite company or go to
www.zdtv.com/getzdtv.**



Television About Computing™



You can watch ZDTV on DIRECTV (channel 273) and DISH Network (channel 191).



© ZDTV LLC 1998. ZDTV is a trademark of Ziff-Davis Inc. Call for Help is a trademark of ZDTV. Television About Computing is a registered trademark of ZDTV. DIRECTV is a registered trademark of DIRECTV, Inc., a unit of Hughes Electronics Corp. DISH Network is a trademark of EchoStar Communications Corporation.

EVERYTHING POINTS TO MICROPOINT.®

Every move on the stationary Micropad corresponds to a fixed point on the screen, giving you pinpoint control.

Train MicroPoint in the ways you like to work with its easy-to-program, three-button automation techniques.

Ergonomic design fits any hand, left or right, and fights fatigue and Repetitive Stress Injury.

Exclusive dynamic optical tracking technology increases speed and productivity, with pixel-by-pixel precision.

Guaranteed 100% PC and Mac compatibility

ALTRA

\$79⁰⁰

**TRY MICROPOINT, THE NEXT GENERATION
POINTING DEVICE FOR 30 DAYS, FREE!**

**Order Now and
Get Free
Same-Day Shipping!**

Whether it's surfing the web, balancing the family checkbook or the latest video game, MicroPoint is the one pointing device for the entire family. Call and arrange for your free 30-day trial, and we'll ship your MicroPoint today, at no extra charge.

Call 1-800-213-5908 today and try MicroPoint for 30 days, free!



Taking Style Sheets to the Next Level

By William Robert Stanek

People will look back on 1998 as the year the Web graduated, and one of the technologies taking us to the next level is the Cascading Style Sheets (CSS) specification. With Cascading Style Sheets, you can create Web pages with consistent colors, precise positioning of content, and other stylish embellishments. Like most other Web technologies, Cascading Style Sheets have gone through a metamorphosis in recent months, and what once was a simple fix for adding stylish content to a Web page is now a comprehensive solution for many types of structured documents.

Indeed, one of the goals of the latest style sheet specification is to define style elements that can be applied to structured documents of many different types, including HTML (HyperText Markup Language) and XML (Extensible Markup Language) pages. HTML, the markup language for traditional Web pages, is used to format text and multimedia to be viewed in browsers, such as Microsoft Internet Explorer and Netscape Navigator. XML is designed to structure data so that it can be transferred over a network. The latest CSS specification seeks to define style elements that can work with formatted text and multimedia as well as data structures.

The original implementation of the Cascading Style Sheets specification, designated as level 1 (CSS-1), has since been extended with several different proposals. One is the *CSS-P* (Cascading Style Sheets Positioning) proposal, which defines how content within a page can be precisely positioned. Both Internet Explorer 4.0 and Navi-

gator 4.0 implement extensions for positioning content. While Microsoft chose a path similar to the *CSS-P* proposal, Netscape took a very different route—and the result is that there are several different ways of positioning content within a Web page.

All these options for positioning content have confused many Web developers. Fortunately, the *CSS-2* (Cascading Style Sheets, level

could fill several books. So let's take a look at what's happening with style sheets and see if we can sort it all out.

MEDIA TYPES

A significant shortcoming of HyperText Markup Language is that HTML pages are generally designed for viewing on a computer screen. If you've ever tried to print a Web page, you know that what looks good on the screen doesn't necessarily look good in print. In fact, some Web pages print illegibly or not at all.

The *CSS-2* specification defines a set of media types and details how they could be handled in various situations. To improve flexibility, the list of media types outlined in *CSS-2* is not meant to be definitive. This will allow the browser or other application handling the page to support additional media types in the future.

HTML 4.0 created the foundation for working with various types of media, but it did not specifically define extensions that you could use with these additional media types. Thus *CSS-2* takes over where HTML 4.0 left off, by defining specific extensions for various types of media. There are many media types, including TV, hand-held computer, and Braille. This article will focus on the two primary ones, screen and print. Later in the article, I will also discuss the aural media type, used with aural style sheets.

One of the reasons Web pages don't print well is that your computer screen is a *continuous* medium, and a printout is *paged*. On the screen, your pages flow continuously, and all the user has to do is scroll up or down. Here you don't have to worry about page breaks, margins, or any of the other layout elements that can make a printed document look terrific.

On the other hand, when you print a document, the flow

of the document from page to page really matters. You want your page breaks to flow well, and you want the layout of each page to be precise. You don't want your pages to be all jumbled up, as happens when you print a typical Web page, especially one that contains large graphical banners or image maps.

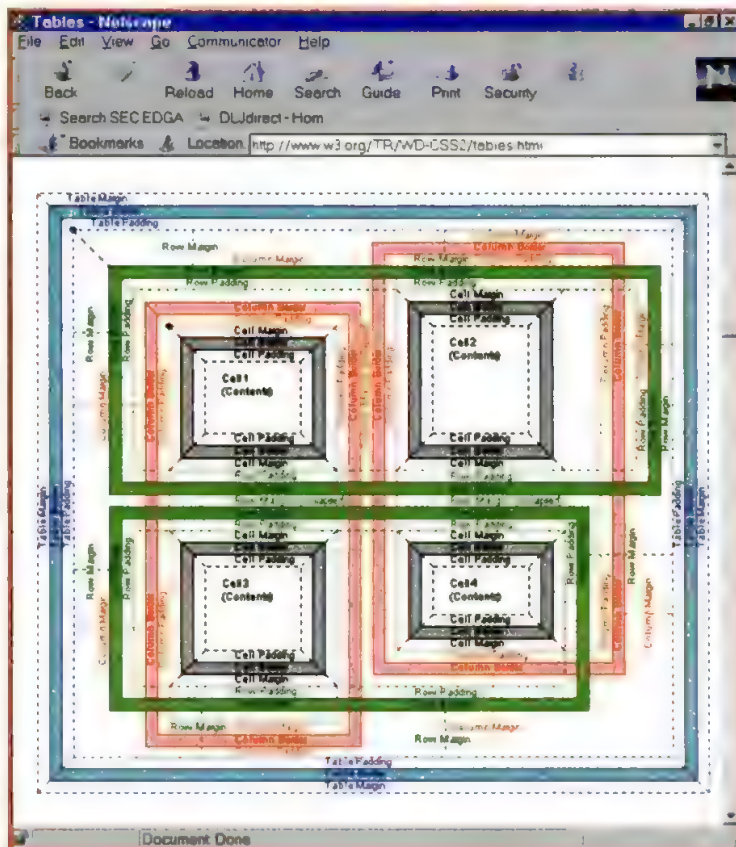
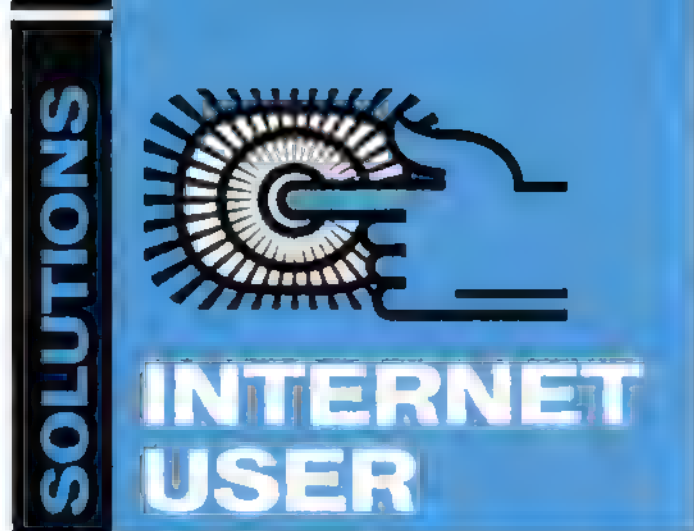


FIGURE 1: The *CSS-2* visual rendering model offers remarkably precise control over element spacing, positioning, and style.

2) proposal incorporates the core aspects of the positioning extensions exceedingly well. The result is that you'll soon have a standardized toolkit for positioning elements in a Web page. Beyond this, the level 2 proposal also includes quite a few surprises. Put all these changes together and you have a topic that



With CSS-2, you can define precisely how a Web page should look in print. You accomplish this by defining how the printer should handle each printed page, and setting margins and inserting page breaks are only the beginning.

Because documents often have different types of pages, you can also tell the printer how to handle them within the document. For example, CSS-2 allows you to give the first page of the document a unique layout, and you can make left and right pages follow a different scheme as well. Combined with precise control over media extensions, this has finally given Web publishers real control over how their pages look. It makes quite a difference.

AURAL STYLE SHEETS

Aural style sheets are designed to help Web publishers create presentations that can be heard rather than read. With these extensions in the style sheet specification, you will be able to hear a synthetic voice read a Web page without special equipment.

Aural style sheets provide easier access to the Web for people with disabilities and also make it easier to surf the Web when you're on the go. For example, your car's on-board computer could read Web pages to you during your morning commute. (Think computers in your car are a long way off? Think again. Quite a few manufacturers already sell devices for mobile computing.)

If you've ever worked with speech synthesis, aural style sheets may seem quite intuitive. On the other hand, if you've never worked with this type of technology, you'll need to spend some time experimenting with it. At the most basic level, aural style sheets are a new twist on an old technology—voice synthesis software. For the Web, the voice synthesis software could be implemented as a browser add-on.

You use voice synthesis software to simulate various types of voices by modifying the volume, frequency, and speed of computer-created speech. Aural style sheets build on this basic model by providing a rich set of controls over the speech synthesis. You can add pauses to the speech, for example, and auditory cues such as a bell. You can also mix in background sounds.

Beyond this, you can control the stress, richness, and spatial properties of the voice as well. To change the stress of an element in a Web page, you emphasize or de-emphasize it by controlling the amount of inflection associated with the element. To change the richness of an element, you add resonance so that the voice carries or reduce the resonance to make the voice softer. By manipulating the spatial

qualities of voices, you can create 3-D sound or even sound that seems to come from different areas of the room. Can you imagine a Web page that could carry on a running conversation with many different voices?

VISUAL RENDERING MODEL

One of the greatest shortcomings of HTML—or any similarly structured markup language—is that content and formatting are intermixed. For example, the `<TABLE>` tag tells the browser to display an element as an HTML table. You can define the look and feel of the table by setting attributes for the table and its elements, such as width and alignment. If you want to change the look and feel of all the ta-

**Treating elements as
containers opens the door
to a whole new way to
handle Web page design
and to separate content
from formatting.**

bles in your page, however, you need to reformat them one by one. If you want to change the look and feel of all the tables used at your Web site, you have to edit every single table in every page at your Web site—a tedious and time-consuming process, to say the least.

Yet the inflexibility of structured HTML is often the least of your worries. When you use advanced elements, such as frames, you run the risk of breaking older browsers. To compensate, you have to define a page for browsers that do not use frames, which means you now have to create and maintain two versions.

Add layers of information to this frame-enhanced page with the `<LAYER>` tag and you'll run into a similar problem. Currently only Netscape Navigator 4.0 or later displays layers in this manner. Thus if you use layers, you also need to define a page for browsers that do not support them. Now you have three different versions of the same page.

CSS-2's visual rendering model allows you to separate content from formatting by defining each formatted element in a document as a con-

tainer or box that holds content. Within the box, there could be additional boxes that are defined for subelements, such as the header and data cells of a table. Keep in mind that these containers apply only to formatted elements—such as paragraphs, divisions, and tables—and not to text that is merely styled with physical tags, such as the familiar `<B>`, `<I>`, and `<U>`.

Treating elements as containers opens the door to a whole new way to handle Web page design and finally provides a well-developed way to separate the content from the formatting. By controlling the flow of content within a box, you can control its layout. By controlling the position of a box, you can precisely position the box on the page. By controlling the type of box, you can define various types of containers, such as tables, frames, and even layers.

When you define advanced elements (such as frames or layers) in a style sheet, you don't have to worry about breaking older browsers, nor is it necessary to create several different versions of the same page. You simply define the formatting rules in the style sheet. Compatible browsers render the page precisely as you've defined it. Other browsers simply ignore the noncompatible style sheet definitions.

But the fun is only beginning. Have you ever wondered what it would be like if you could apply a set of advanced formatting rules to your entire Web site instantly? CSS-2 lets you do just that. You simply define the layout rules for your Web site in an external style sheet. Then when you want to apply layout changes, all you need to do is change the external style sheet. Because these external style sheets can define tables, frames, and layers for pages, you can dramatically and easily change the look and feel of your entire site.

SUMMARY

Media types, aural style sheets, and the visual rendering model are only the tip of the CSS-2 iceberg. There are many other goodies tucked away in the CSS-2 proposal, too many to explore here. You can find the latest version of the specification on the World Wide Web Consortium's site, at www.w3.org/TR/REC-CSS2/. In the coming months as the proposal is finalized, you'll start hearing a lot more about the wonders of CSS-2 and the ways the technology may change the Web. 

William Robert Stanek is the author of several books, including Learn the Internet in a Weekend and Increase Your Web Traffic in a Weekend, published by Prima Publishing. His latest book, Server-Side JavaScript: The Definitive Guide, will be published by O'Reilly & Associates in June. He can be contacted at techwriting@tvpress.com.

THE SCANNER THAT ATE THE TRANSPARENCY ADAPTER!

Scan reflective prints on the scanner's upper bed...



Introducing the **ScanMaker® 4**, the all-in-one scanner from Microtek, the most trusted name in desktop scanning. The same innovators who brought you the ScanMaker® III (winner of PC Magazine's Editors' Choice and Best of 1997 awards) now bring you this incredibly fast, dual-media color scanner.

The ScanMaker 4 features Microtek's own patented **Emulsion Direct Imaging Technology™ (E.D.I.T.™)**. Unlike a conventional flatbed scanner which scans film with an attachable transparent media adapter (usually an accessory item purchased separately), the ScanMaker 4 captures images directly from the surface of film transparencies or negatives — *internally*. No more light refraction problems. No more annoying Newton rings. Just amazingly sharp images loaded with detail. Photographic prints, illustrations, or documents up to 8.5" x 14" can be scanned on the scanner's upper bed.

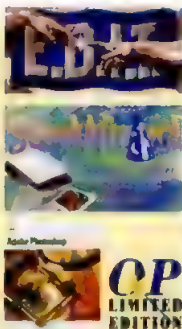
The scanner's 36-bit color depth (input and output), 600 x 1200 dpi optical resolution (up to 9600 dpi enhanced) and superior optics deliver performance suitable for any company's graphic needs. And for quick, conflict-free installation, the ScanMaker 4 includes the **Adaptec 2902E PCI SCSI interface card**. All this and some great software for a suggested retail price of only \$699, it's almost like getting two scanners for the price of one.



ScanMaker 4

FEATURES

- Microtek's patented Emulsion Direct Imaging Technology™
U.S. Patent No. 5,574,274
- Full 36-bit color depth — input and output
- 3 long-life cold cathode lamps
- Adaptec 2902E PCI SCSI interface card
- 600 x 1200 dpi optical resolution / 9600 dpi enhanced
- Microtek's ScanWizard™ scanner controller
- Adobe Photoshop LE image-editing software
- MetaCreations™ Painter™ 5
- Caere OmniPage Limited OCR software for scanning text



Painter 5

MICROTEK

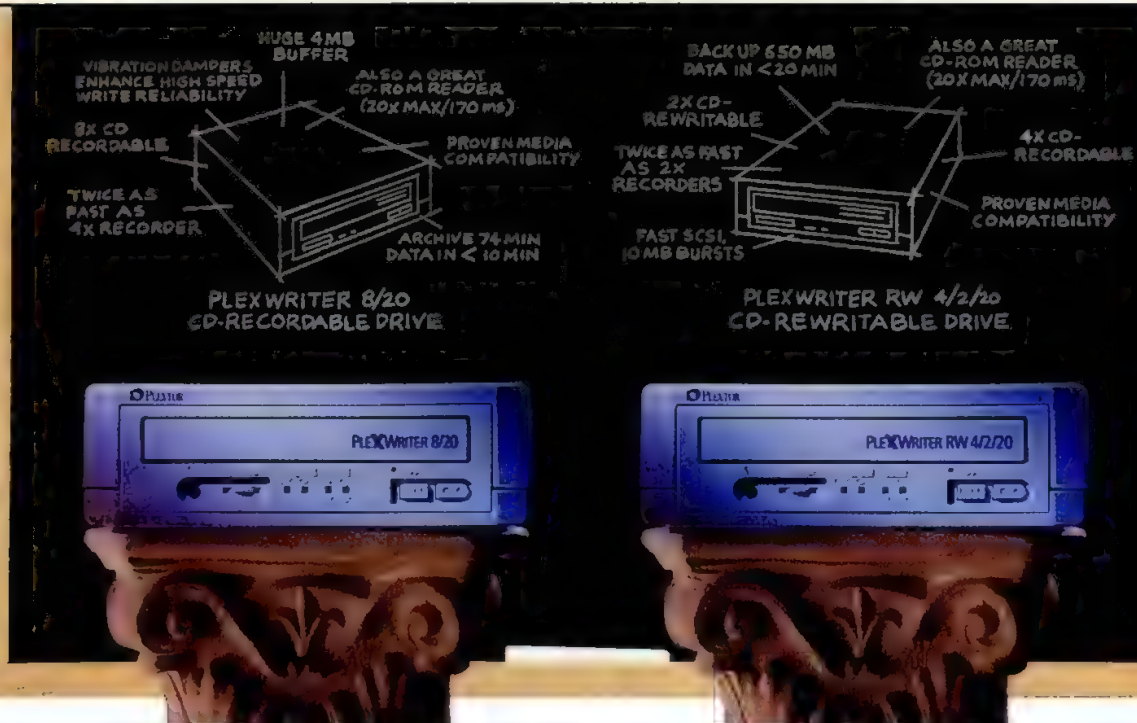
www.microtekusa.com
1-800-654-4160

Bundled software and manuals on CD-ROM. All products mentioned are trademarks or registered trademarks of their respective holders. Price is United States suggested retail price. Specifications, price and software bundles are subject to change without notice. SM4PCMAG

Choose 091 at www.pcmag.com/infolink

PlexWriter 8/20 & PlexWriter RW 4/2/20

Write Like a Genius.



Introducing two new Plextor CD writers. The fastest and most reliable performance in their class.

PlexWriter 8/20 CD-Recordable Drive. With 8X write speed, 20X read speed and 170ms access time, it's twice as fast as any 4X recorder. Archive 74 minutes of data in under 10 minutes. You can even replace your old CD-ROM drive and get two drives in one.

Fast SCSI burst rates, vibration dampening, superior cooling action and a hunky 4MB buffer ensure eagle-eye read-and-write accuracy. Fool-proof media recognition automatically adjusts power and burn time—so you can write without failure. And bundled software supports CD to CD-R direct duping, digital audio capture/playback and HDD recovery from bootable CD.

The PlexWriter 8/20 CD-R. Available late November 1998.

PlexWriter RW 4/2/20 CD-ReWritable Drive. Another high-performance first for Plextor. Now you can replace your 8X and under CD-ROM drive and get two drives performing three functions—all in one tough shell. With 4X write, 2X re-write, 20X read and 170ms access time, it's twice as fast as most 2X CD-RW drives. Back-up 650MB of data in under 20 minutes with drag and drop simplicity.

Fast SCSI burst rates and a 2MB buffer ensure read-and-write accuracy every time. Fool-proof media recognition automatically adjusts power and burn time—so you can write without failure. And bundled software supports CD to CD-R direct duping, digital audio capture/playback and HDD recovery from bootable CD.

The PlexWriter RW 4/2/20. Available after January 1, 1999.



Show your intellect. Call 888-553-9242 or visit <http://www.plextor.com/contest/pcmag.html>—enter to win a PlexWriter 8/20.

©1998, Plextor Corp. All Rights Reserved. All trademarks or registered trademarks specified are owned by their respective holders.

Choose 239 at www.pcmag.com/infolink

A Mark of the Best, Made in Taiwan Products

Taiwan's Symbol of Excellence



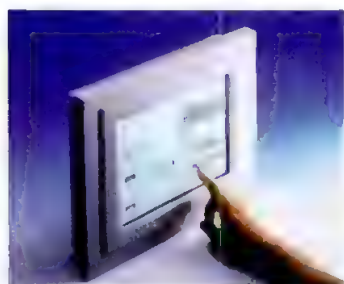
Taiwan: the world's third largest producer of information technology products; the number one manufacturer of ten key computer components; and fourth in the world in semiconductor production.

This is Taiwan today. It is no exaggeration to call Taiwan "Silicon Island" and the "PC Capital of the World." Over the past ten years, Taiwan's information technology companies have made their mark in the global marketplace, both with self-branded products and Original Design Manufacturing for the world's leading IT companies. Taiwan's IT industry has truly become the backbone of the island's economy as well, with IT products, primarily computer hardware, accounting for 28% of total exports in 1997.

Behind this increasingly important standing in the global marketplace are leading Taiwan companies, like Acer, MITAC, UMAX and many others. Products bearing these corporate names are now recognized around the world as not only the best from Taiwan but the best in the world. These companies are also winners of the coveted Symbol of Excellence award.

Each year, the Taiwan government and industry recognize the most innovative and highest-quality products made in Taiwan. Hundreds of products are submitted each year, but only 278 were designated in 1998 as Symbol of Excellence winners. These products can be immediately recognized by the Symbol of Excellence logo, a five-point interlocking red symbol, which award recipients can use on all relative packaging and advertising. This logo tells consumers that this product is "very well made in Taiwan."

For an elite group of up to 30 products, there is an even greater distinction as a National Award of Excellence winner.



ADVANTECH Super Slim Panel PC

This year, an expert panel of judges selected 27 products, hailing from the computer, telecommunications, heavy machinery and other key industry sectors. This winning team symbolizes Taiwan's transformation in manufacturing from low-cost, low technology

to today's high-quality, innovative and high value-added products.

Five of these products also received the ultimate prize in the Symbol of Excellence program: the Gold National Award of Excellence. Elected by a distinguished panel of international judges, these five products stand apart as the very best of the best from Taiwan.



MUSTEK Video Digital Camera

To win the Gold, these products excelled in all five evaluation criteria, including market position, R&D/Innovation, brand awareness, quality systems and design. In addition, the Gold winners truly encapsulate the meaning of "Innovalue", or the combination of Innovation and Added Value. Innovalue is a term coined for the Symbol of Excellence program. It is the unique genius Taiwan companies possess in making leading-edge products that are quickly and affordably accessible to consumers around the globe. Innovalue is the Taiwan advantage.

Taiwan #1 World Marketshare in Ten Product Categories

Product Category	Total Production Volume	Percentage of World Production
Scanner*	9,520,000	70.6%
Switching Power Supply	50,370,000	63%
Motherboard	43,554,000	60.5%
Modem	17,318,000	48.4%
Hub	2,800,000	50%
Casing	53,790,000	74.7%
Monitor	40,600,000	54.6%
Mouse	50,560,000	62.8%
Keyboard	50,750,000	62.2%
Graphic Card	14,519,000	43.6%
Notebook PC **	4,465,000	30%

* Includes hand-held and desktop scanners

** Number two in the world for Total Production Volume

Source: Data provided by Taiwan's Market Intelligence Center, Institute for Information Industry. Figures are totals for 1997 production.



TAIWAN. Your Source for INNOVALUE



This Symbol has helped Taiwan become the PC Capital of the World.

Taiwan today creates a third of the world's PCs.

From companies like Acer, Umax, Twinhead, Mitac - all winners of the prestigious Symbol of Excellence - information products from Taiwan are covering the world.

Apart from quality and world class design, these products also offer a unique Taiwan benefit: Innovalue. Through innovation in design and manufacturing, Innovalue creates an added value for products, so you get more for less.

See us at COMDEX, Booth No. S2028.

Taiwan.
Your Source for InnovalueSM

In real life,
problems can happen!



Giga-Byte Motherboards

Cleverly designed to prevent mishaps from happening!



**Soft CPU temperature sensor
protects against CPU overheating**



**Anti-virus utility protects
against virus attacks**



**Open case detection protects
against unauthorized entry**



**3 fan-speed detectors protect
against overheating and
resulting crashes**

GA-6BXE



- Intel 440BX AGPset
- Slot 1 & AGP slot support
- Supports 66/75*/83*/100/112*/124*/133* MHz
- AC Recovery ON/OFF Control Build in BIOS
- Supports 3 Fan Detection Connectors
- System Health Check & Report by BIOS during boot
- Intel LDCM* Utility

GA-6BXC



- Slot 1 & AGP
- Supports 66/75*/83*/100/112*/133*MHz plus auto select insystem speed
- 3 DIMMs up to 768MB DRAM
- Power-on by keyboard, PS/2 mouse, LAN, & modem
- Supports SB-LINK™ connector for Creative AWE64D

GA-5AX



- ALi Aladdin V (M1541 & 1543C) AGPset
- Intel, AMD, IBM, Cyrix Processor 100~550 MHz Ready
- Socket 7 & AGP slot support
- 3 DIMMs up to 768MB DRAM
- 66/75/83/95**/100 MHz main clock
- CPU Temperature sensor by Thermistor (very close to CPU)

GA-612



- Optimized drivers for OpenGL 1.1, DirectX 5.0 GDI and much more
- Full 2X AGP Support (AGP VxD)
- Full Sideband AGP Initiator Support
- Fully-Featured 3D Functions Integrated 24-bit 220MHz RAMDAC
- 8MB 100MHz SDRAM on board

* All trademarks are the property of their respective owners

* These speed settings are not guaranteed by Giga-Byte
** Rev.3.0 and above only



GIGA-BYTE TECHNOLOGY CO., LTD.
5F, No.9, Alley 6, Lane 45, Pao Shin Road,
Hsin-Tien, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-29184839
Fax: 886-2-29184842 29158867
<http://www.gigabyte.com.tw>

OVERSEAS BRANCHES:
G.B.T. INC. (U.S.A.)
Tel: 1-626-854-9338 Fax: 1-626-854-9339
<http://www.giga-byte.com>
G.B.T. TECH. TRADING GmbH (Germany)
Tel: 49-40-255015-17 Fax: 49-40-2500986
NIPPON GIGA-BYTE CORPORATION (Japan)
Tel: 81-6-626-6161 Fax: 81-6-626-6171
SHANGHAI OFFICE (China)
Tel: 86-21-64739145 Fax: 86-21-64453227

COMDEX
Fall '98
Nov., 16-20, 1998
Booth: S30348
SANDS-Upper Level



**SYMBOL OF EXCELLENCE
WINNER**

Choose 200 at www.pcmag.com/infolink

SAVE SPACE WITH A SMILE.



Introducing Short-Length

The Smile CA8719SL short-length monitor offers the big-screen productivity of a 17" while only taking up the desk space of a 14". So you get more data on the screen. And more elbow room at your desk. The bigger screen is enhanced by an AGRAS coating, a high contrast CRT, and an extra fine dot pitch. These advanced features will brighten your day with extra crisp characters and bright colors. And the 1600 x 1280 maximum resolution will expand your view of spreadsheets, documents, and Web

pages without straining your eyes. The low price will minimize the strain on your checkbook. And to keep the good feelings going, Smile provides a 3-year warranty on CRT, parts, and labor. So don't worry. Be happier with more room on your desk, more information in the picture, and more cash in the bank. When it comes to increasing productivity, nothing has more power than a Smile!

Visit www.smilekfc.com for detailed specifications today.

Smile Short-Lengths	CA8919SL	CA8719SL
Size/Viewable	19"/18"	17"/16"
Dot Pitch	.25mm	.25mm
Max. Res.	1600x1280	1600x1280
USB	Hub	Optional Hub
Controls	Digital OSD	Digital OSD



CA6736SL(NF) 17" CromaClear™



SYMBOL OF EXCELLENCE WINNER

Smile
INTERNATIONAL, INC.™

See us at Fall COMDEX booth S3021A

When considering your visual display needs.....



C5B

- 15" (13.7" viewable)
- 0.28 mm dot pitch
- 1024 x 768 max resolution at 85Hz
- TCO compliance
- Plug & Play



C7B

- 17" (15.9" viewable)
- 0.25/0.27 mm dot pitch
- 1280 x 1024 max resolution at 60Hz
- TCO compliance
- Plug & Play



C7G

- 17" (15.9" viewable)
- 0.26/0.28 mm dot pitch
- 1280 x 1024 max resolution at 60Hz
- TCO compliance
- Plug & Play

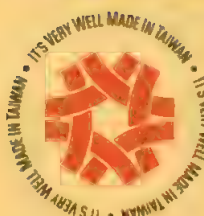


VISION ON TOP



C7N

- 17" (15.9" viewable)
- 0.26 mm dot pitch
- 1600 x 1200 max resolution at 75Hz
- TCO compliance
- Plug & Play



C9N

- 19" (17.9" viewable)
- 0.26 mm dot pitch
- 1600 x 1200 max resolution at 75Hz
- TCO compliance
- Plug & Play



L4KAS

- 13.8" TFT LCD
- 16 Million Display Colors
- 150:1 Contrast Ratio
- 1024 x 768 max. resolution at 75Hz
- Plug & Play
- 1W+1W Audio Output

L5KBS

- 15" TFT LCD
- 16 Million Display Colors
- 300:1 Contrast Ratio
- 1024 x 768 max. resolution at 75Hz
- Plug & Play
- 1W+1W Audio Output

Welcome to be our distributor or reseller. Please Contact now for more information.....

COMDEX
Fall '98 Booth: L3156
Las Vegas Convention Center

TATUNG Co.
Visual Display Business Unit
22 Chungshan Rd. 3rd Sec.
Taipei, Taiwan 10451, R.O.C.
TEL: 886-2-2592192 Ext. 2402, 2521, 2516
Fax: 886-2-2592192 Ext. 2644, 2569
E-Mail: info@tatung.com.tw
Web: <http://www.tatung.com.tw>
FTP: <ftp://ftp.tatung.com.tw>
Attn: Mr. H. C. Lee

TATUNG Co. of America, Inc.
2850 E. Presidio Street, Long Beach
CA 90801-3764
TEL: 1-714-531-1155, 310-637-2105
FAX: 1-714-531-1155
E-Mail: usa@tatungusa.com
Attn: Mr. Man-Lien

TATUNG (U.K.) Ltd.
Stafford Park 10, Telford, Shropshire TF3
1AB, England
TEL: 44-1832-290111
FAX: 44-1832-290104
E-Mail: uk@tatung.co.uk
Attn: Mr. Simon Chan

TATUNG Co. of Japan, Inc.
Sakae Bldg. 10F, 2F, 10-5
Ginza 4-chome, Chuo-Ku,
Tokyo 104, Japan
TEL: 81-3-431-2960, 3545-2205
FAX: 81-3-431-4455
E-Mail: ctm@tatung.co.jp
Attn: Mr. C. T. Lin

TATUNG Electronics(Singapore) PTE
Ltd.
No.4, Astrucity Rd., Jurong Town
Singapore 619222
TEL: 65-63454326, 2655297
FAX: 65-6347404
Telex: 930304RPTATUNG
E-Mail: singapore@tatung.com.sg
Attn: Mr. C. K. Wang

TATUNG Liaison Office, ROK
Room 1105, Jamsil Bldg., No. 441
Donghae-1Dong, Mapo-Ku, Seoul, Korea
TEL: 82-2-261-1192, 1198971
FAX: 82-2-261-1615
Attn: Mr. C. Tseng

TATUNG (Thailand) Co. Ltd.
89/24, 25, 17th Fl., Alankorphan 235, Tower
1, Sanitachong, Hateronayak Road
Dusit District, Bangkok 10300, Thailand
TEL: 66-2-254-1113
FAX: 66-2-254-1113
E-Mail: thailand@tatung.co.th
Attn: Mr. K. V. Wang

TATUNG International (Deutschland)
GmbH
Max-Planck-Strasse 42
40634 Mettmann-Marsdorf
Deutschland, Germany
TEL: 49-214-244-2441
FAX: 49-214-244-2441
E-Mail: deutschland@tatung.com
Attn: C.O. Mr. C. V. Wang

Choose 349 at www.pcmag.com/infolink



Easy COMPUTING

for a new generation of PC users

**YES
YOU
CAN!**

★ **BUY LIKE
AN EXPERT**

★ **SURF
THE WEB**

★ **PLAY
GAMES
ONLINE**

★ **DESIGN
A KITCHEN**

PC

a for
Everyone!

From the Editors of
PC Magazine

Display until September 14, 1998
Summer 1998

WINDOWS 98
A Visual Guide
To Your
New Operating
System

How to Buy
And Use
The New
Bargain
Computers

U.S. \$3.99 / CAN. \$4.99



(It doesn't get any easier than this.)

P O R T A B L E MULTIMEDIA



The PocketCD™
AECDC12X



POCKETDVD™

PCMCIA DVD-ROM DRIVE

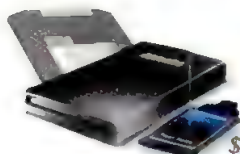
Includes Windows 95/98 MPEG II Decoding Software

2x DVD-ROM

20x CD-ROM

The Addonics Pocket Series

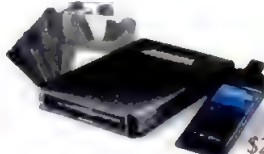
POWER UP
Your Notebook
PC Battery!



\$249*

POCKETZIP™

- Includes FREE ZIP Disk with Zip® Tools & Special Audio Recording Utility



\$249*

POCKETSUPERDISK™

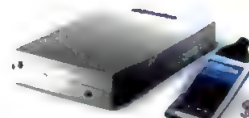
- 2 Drives in 1: 120MB, LS-120 and Standard Floppy Disk



\$199*

POCKETCD98™

- PCMCIA 24x CD-ROM



\$199*

MOBILEZIP™

- 8.0 x 4.9 x 1.3 in., 22 oz.
- Portable and Affordable

"Listen to what the Critics have to say..."



EDITOR'S CHOICE AWARD WINNER "The PocketZIP...scores a big win...smallest ZIP drive yet...operates whisper quiet...constructed and sized for real-world use."
WEBREVIEWS.COM



"Addonics' PocketSuperDisk works like a dream, offering all notebook users easy, portable access to this convenient storage medium."
LAPTOP BUYER'S GUIDE (October 1998)



"The PocketCD is particularly well suited for portable use." LAPTOP BUYER'S GUIDE AND HANDBOOK (May 1998)



9 OUT OF 10 "Addonics' new PocketZIP offers blazing speed...outtrun the ZIP Plus in SCSI mode...turned in the best seek time...the PocketZIP is a worthy choice."
BOOT MAGAZINE (July/August 1998)



"(PocketSuperDisk) may be the ultimate drive for the laptop user...everything went as smoothly as the brochure promised." MICROTIMES (September 9, 1998)



"Addonics' PocketCD is one of the slickest solution I have seen...beauty of the PocketCD is its versatility...the perfect addition (to your portable computer)." MICROTIMES (April 22, 1998)

All Products Support DOS, Windows 3.1/95/98/NT. * Estimated Street Price.

Distributed By:

D&H

Tech Data

Available At:

COMPUUSA

STAPLES

MICRO CENTER

Office DEPOT

Fry's

CDW

MicroWAREHOUSE

New World CORPORATION

MIDWEST MICRO

PC Connection

UNPLUG.IT

LAP-TOP

DATA VISION

Micro

PC Connection

Addonics®

A member of the ACER Group

48434 Milmont Drive, Fremont, CA 94538
510-438-6530 / 800-787-8580 / 510-353-2020 fax
www.addonics.com / atc@addonics.com

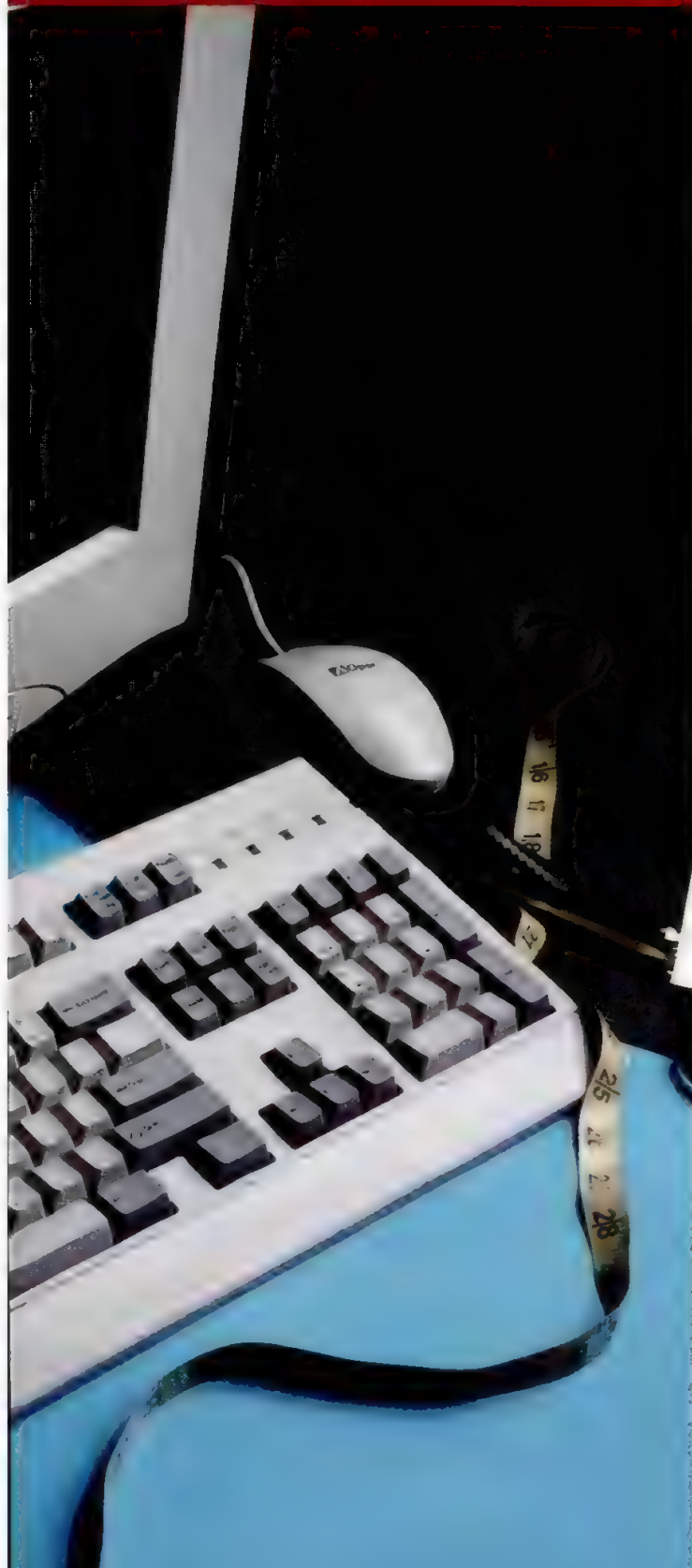
Check out our website www.addonics.com for up-to-date pricing and store availability.

All brand and product names are registered trademarks of their respective companies. Products and specifications are subject to change without notice. Copyright © 1998 Addonics Technologies. All rights reserved.

Choose 025 at www.pcmag.com/infolink

The Custom Fit





Now get the flexibility of truly customized PCs with the consistent quality and value of AOpen Certified

Components. Built-to-order configurations actually ready-to-deliver in 48-hours! And, your AOpen Custom PC, like the super fast Pentium® II processor-based TBS-M450, includes your choice of Microsoft Windows® 98,

Windows 95® or Windows® NT operating systems.

With AOpen you also get the power, service and support of a highly-respected multi-billion-dollar worldwide conglomerate. So if you're in the market for just a few Custom PCs or enough systems to globally support an entire company, check-out the benefits of AOpen. You might be surprised at how much more your money can buy with AOpen's Custom PCs.



AOpen's **EXTRA** Value

☒ **FLEXIBILITY**
All AOpen Custom PCs Are Built-To-Order

☒ **CONSISTENCY**
Built Only With AOpen Certified Components

☒ **PERSONAL SERVICE**
Local Service Centers With National Support

☒ **FAST TURNAROUND**
All Systems Built & Ready-to-Ship in 48 Hours

☒ **EASY UPGRADES**
Today's Specs With Tomorrow's Advances

☒ **FINANCING-PLUS**
OpenCredit Easy Leasing Program

We're the only brand-name manufacturer that you can depend on to deliver truly Custom PCs with the best technology exactly the way you want them. As a part of the 3rd-Largest PC company in the world, we have the strength and reputation to stand behind every AOpen Custom PC you buy.

AOpen® CustomPC™

1-888-33-AOPEN

www.AOpenPC.com

Become an AOpen Custom PC Registered Reseller.
Call 1-888-883-2237 for easy fax-back registration.
Request document number 1001.

©Copyright 1998 AOpen America, Incorporated. All rights reserved. 1911 Lundy Avenue, San Jose, CA 95131. Fax: 408/522-8555. Product specifications subject to change without notice. AOpen and AOpen Custom PC are trademarks and the AOpen logo are registered trademarks of AOpen Inc. MSN, Microsoft, 95, 98 and NT are registered trademarks of Microsoft Corporation. Intel Inside and Pentium are registered trademarks of Intel Corporation. All other brands, products or company names are trademarks or registered trademarks of their respective companies. • AOpenPC SP80 10/98

Choose 212 at www.pcmag.com/infolink

Fly High With Me

Your Partner In Innovative Computing Products



Essentia

Intel® 440BX-based
booksize PC & 15"
TFT LCD monitor



AVENIA LP 6613

Intel® 440BX-based
LCD PC
15" TFT LCD



MITAC



Global Resources Serving Individual Needs

(URL): <http://mitac.mic.com.tw/>

MITAC INTERNATIONAL CORP. No. 40 Wen Hua 2nd Rd., Kwei San Hsiang, Taoyuan, Taiwan, R.O.C

Tel: 886 3 3289000 Fax: 886 3 3280926

E-mail: sharon.lee@smtpink.mic.com.tw



As a computer supplier, you need a manufacturer with experience, expertise, and a reputation for good quality products.
 A manufacturer whose culture is customer satisfaction, making sure you're totally satisfied.
 A manufacturer with a solid track record and a strong, multi-system team committed to long-term business partnerships.
 A manufacturer devoted to innovation, offering the latest comprehensive range of award-winning products.
 A manufacturer with global reach, manufacturing both desktop (DTP) and notebook (LPT) systems worldwide.

Visit us in person at the PC EXPO 2000 in Las Vegas.

COMDEX
Fall '98
November 16-20
 Booth No. L2035
 Las Vegas Convention Center

MINI Note 6033

Pentium® II notebook
 13.3" TFT LCD



LEXTRON Series

Entry level
 server system



MISTATION

440BX/440ZX
 Micro ATX system

The Cool Choice

C903P 19" Intelligent Monitor



18" viewable area

Introducing Cooler Components

Patented circuitry and Palo Alto Design Group's sleek new case team up in the C903P for maximum ventilation, cooler operation, longer life, and lower power consumption.

Shamrock introduces a monitor of elegance and heightened functionality—the exciting C903P. With this monitor, design is the key word. The C903P utilizes Shamrock's patented circuitry design. As a result, dynamic and static regulation for both vertical and horizontal directions stays under 0.5mm, bringing power consumption down to between a remarkable low of 93.5 and an equally remarkable high of 103 watts—depending on resolution.

The result? A monitor that looks cool, runs cool, and dissipates heat to prolong its own life beyond 60,000 hours. Minimizing the wear on monitor components, however, is just

the first step to building a great monitor. Sparkling image quality in the C903P benefits from the shadow mask CRT and DynaColor,[®] a jointly developed microchip for four-corner color control. In addition, state-of-the-art high voltage deflection yields a stable display even when switching intensity levels.

Additionally, with 25% more screen real estate than 17" monitors, the C903P lets busy executives breeze between open applications or get comfortable in one huge application. Shamrock thinks you should have it all now.

Call 888-801-8899 or visit www.shamrockusa.com for more information today!



Distributors:

Supercom Industries (847)228-9111

Jenish Distribution (562)946-9392

Leadman Electronics (877)Leadman



MPR-II
Standard

ISO 9002
ISO 14001

Plug & Play

©1998 Shamrock Peripherals Inc. Specifications subject to change without notice. All other trademarks and names are the property of their respective owners.

TWTC TAIPEI
WORLD TRADE CENTER

Hi tech clicks on Taiwan



In 1997, Taiwan's IT industry produced an incredible US\$35.784 billion worth of computer equipment. That makes Taiwan the third largest computer manufacturer in the world.

No wonder everyone in the IT business is clamoring to get a spot at COMPUTEX TAIPEI '99. There's simply no better place to eye the industry's latest offerings.

Don't miss this major industry event!

Organizers:



China External Trade
Development Council
(CETRA)

5, Hsin-yi Road, Sec. 5, Taipei 110, Taiwan, R.O.C.
Tel: 886-2-2725-1111 Fax: 886-2-2725-1314
<http://www.cetra.org.tw>
<http://taipeitradeshows.cetra.org.tw>
E-mail: computex@cetra.org.tw



Taipei Computer
Association (TCA)

Sponsor:



Taipei World
Trade Center

Venue:

Taipei World Trade Center Exhibition Hall

Taipei International Convention Center

For more information, please contact CETRA
or its local office
Taiwan Trade Center, New York Inc.
N.Y. U.S.A.
Tel: 1-212-7304466, Fax: 1-212-7304370



COMPUTEX
TAIPEI '99

Taipei International Computer Show

June 1-5, 1999

[Oversize is Overrated]

Orlimar TriMetal Fairway Woods

Revolutionize Club Design

with Multi-Material

Technology

MASTER CLUB DESIGNER JESSE ORTIZ has revolutionized the golf industry. "The future of golf equipment design is in multi-materials which allow for a more effective distribution of weight throughout the clubhead, giving the club better playability and more forgiveness," said Ortiz. Multi-Material is the future. You won't believe the performance! Try the Orlimar TriMetal Woods today! Call (800) 397-8710.



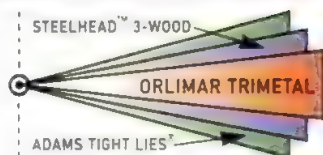
MULTI-MATERIALS ARE THE SECRET BEHIND TRIMETAL TECHNOLOGY.

Here's how we did it: By developing a face made of our unique Alpha Maraging™ steel, we produced a hitting area over 85% harder than pure titanium. We were able to move weight away from the face and re-distribute it to the soleplate with three strategically placed copper-tungsten weights. The result is an extremely low center of gravity.

A DEFINITION: What do we mean by Multi-Material?

It's the marriage of the best performance benefits of three distinct metals: the Alpha Maraging steel face, copper-tungsten weights in the soleplate, and a 17.4 stainless steel shell. This breakthrough is the heart of Orlimar's industry-leading technology.

making it effortless for you to get the ball airborne on a perfect trajectory. But we didn't stop there. We then incorporated a traditional, classic shape and size with special attention to a wider and more forgiving club face. Call now! You won't believe the results! (800) 397-8710.



Independent Tests Prove TriMetal is Longer and Straighter.

20% straighter, 4.3 yds longer than Steelhead. 44% straighter, 8.75 yds longer than Tight Lies

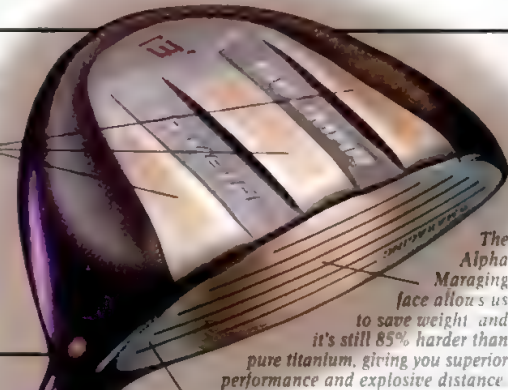
ORLIMAR TRIMETAL
(15" 43" graphite firm)
Dispersion: 15.8 yds
Carry: 218.30 yds

STEELHEAD 3-WOOD
(15" 43" graphite firm)
Dispersion: 19.08 yds
Carry: 214.00 yds

ADAMS TIGHT LIES
(16" 42.75" graphite firm)
Dispersion: 28.59 yds
Carry: 211.55 yds

Average of 12 center 12 half-inch toe, 12 half-inch heel hits. Clubhead speed: 100 MPH

Copper-tungsten weighting is our secret to giving you better performance. We've taken weight out of the face and put it here creating a much lower Center of Gravity.



The Alpha Maraging face allows us to save weight and it's still 85% harder than pure titanium, giving you superior performance and explosive distance.

Forgiveness is our hallmark. See how wide the face is? Since most golfers miss the ball horizontally on the toe or heel, we made the face wider rather than higher.

NOT OVERSIZE. THE RIGHT SIZE.

"This club and this technology is for real." NBC-TV golf analyst Roger Maltbie knows golf: "This is the direction golf is headed. If you love golf, you owe it to yourself to give the Orlimar TriMetal a try. Oversize is Over! The TriMetal is the right size club."



(800) 397-8710

TRIMETAL #1 ON PGA TOUR*

MICHELOB CHAMPIONSHIP (Oct. 11, 1998)

RANK	CLUB MAKER	MODEL	CLUB COUNT
1	Orlimar	TriMetal	46
2	Callaway	Steelhead	25
11**	Adams	Tight Lies	2

*Company's leading fairway wood model derived from Darrell Survey Co. October 11, 1998. **Tied for eleventh place.

CALL TODAY FOR A FREE VIDEO AND A FREE 1-YEAR SUBSCRIPTION TO GREAT GOLF MAGAZINE.

Order Today! Just 4 easy payments of only \$69.95. Plus S&H. With our 30-Day Total Satisfaction Guarantee. You can also visit your nearest golf shop for a demonstration.

(800) 397-8710

www.orlimar.com



TRIMETAL™

ORLIMAR

The Leader in Multi-Material Technology™

FREE STUFF: Don't forget, when you call toll-free (800) 397-8710, we'll rush you a FREE video with Ken Venturi and Roger Maltbie talking about how you can improve your game with the TriMetal. And they should know. We'll also send you a 1-year subscription to GREAT GOLF Magazine, the inside guide to new technology and in-depth interviews from the world of golf. At absolutely no cost to you. Welcome to the Orlimar family. Call us today, (800) 397-8710. ©1998 Orlimar Golf Equipment Company. TriMetal, Multi-Material and Alpha Maraging are registered trademarks of Orlimar Golf Equipment Company. Callaway, Steelhead, Adams and Tight Lies are registered trademarks of each of their companies respectively.



PC TECH

Advancing the State of the Art Of PC Testing

Each year in this issue, PC Magazine Labs introduces the newest versions of the Ziff-Davis Benchmark Operation's (ZDBOp) industry-standard PC benchmark tests. The system and graphics adapter reviews in this issue ("Professional PCs" and "Graphic Accelerators: Who's the Fastest?") mark the debut of the most significant advancements in these tests in several years. The new benchmark tests—Winstone 99 Version 1.0, WinBench 99 Version 1.0, 3D WinBench 99 Version 1.0, and CD WinBench 99 Version 1.0 (the inaugural release of this suite)—provide the best and broadest array of PC performance tests ever.

Winstone 99 uses scripts that exercise real applications to produce an overall measure of a PC's performance under Windows. This year, we have completely redesigned its Business application tests, added new High-End application tests, and introduced a new test for evaluating dual-processor systems.

WinBench 99 acts as a subsystem-level companion to Winstone 99. WinBench 99 provides detailed information about the performance of all of a PC's major subsystems—processor and RAM, graphics, disk, and full-motion video.

CD WinBench provides detailed performance information about a computer's CD-ROM system. This year, we moved the CD tests into their own benchmark program so we could address some issues peculiar to CD-ROM testing.

3D WinBench 99 lets us address both the performance and rendering quality issues raised by the latest set of 3-D graphics accelerators and systems. It measures 3-D graphics performance by using the Windows DirectX 6 API to render 3-D scenes similar to those in games.

USING TEST RESULTS

If you plan to use these tools, you should follow the same basic testing procedures we employ. The online documentation outlines those procedures. Even after you've followed good testing procedures and produced a set of results, you still need context: Benchmark test results are rarely meaningful in isolation.

One unavoidable consequence of a new release is that the results each



benchmark test produces also change.

Those results are not comparable to the results of any previous benchmark test, not even with the results of an earlier version of the same test.

WINSTONE 99

Today's businessperson rarely concentrates on a single application, but instead moves constantly between a word processor, a spreadsheet, a Web browser, and other tools. For Winstone 98, we experimented with the notion of testing this style of work by including the task-switching tests, and we learned a lot. This year, therefore, task switching is fundamental to the way the Business Winstone tests work.

We've organized Winstone 99's Business

tests around the most popular suites of office products in today's marketplace. Within each of its three office-suite tests, Business Winstone 99 switches between the most used applications in the office suite and Netscape Navigator. The applications are: Corel WordPerfect Suite 8 (Quattro Pro 8, WordPerfect 8); Lotus SmartSuite (1-2-3 97, Word Pro 97); Netscape Navigator 4.04; and Microsoft Office 97 (Access 97, Excel 97, PowerPoint 97, Word 97).

As a result of this new testing approach, Winstone 99's tests no longer fall into categories, so we've eliminated the category scores.

We chose the following seven high-end applications for Winstone 99, because of the range of performance demands they placed on systems: Adobe Photoshop 4.01, Adobe Premiere 4.2, AVS/Express 3.4, Microsoft FrontPage 98, Microsoft Visual C++ 5.0, MicroStation SE, and Sound Forge 4.0. All seven have equal weight in Winstone 99's overall High-End score.

Though most of these applications will run on Microsoft Windows 98, Windows 95, and Windows NT, Winstone 99's High-End tests will run only on Windows NT.

This reflects the way PC Magazine and other ZD publications test systems.

Winstone 99 also includes three new dual-processor inspection tests: Visual C++ MP, Photoshop MP, and MicroStation MP. These applications use multithreaded operations that can take advantage of the power of dual processors. Consequently, the Winstone 99 tests that employ those applications will run on single-processor computers, but they'll perform better on dual-processor systems.

Winstone 99 first measures how long a PC takes to complete each script. It then converts each timing to a score relative to the time a base machine took to complete the same script. In Winstone 99, each overall score is relative to the base machine's score, which we defined as 10.0. The individual High-End application scores and the dual-processor inspection test scores are relative to a 1.0 on the same base machine.

Business Winstone and High-End Winstone have the same base machine, a Dell Dimension PC with a 233-MHz Pentium MMX processor, 32MB of SDRAM, and a 1024-by-768 graphics resolution using 24-bit color. Because the High-End Winstone tests run only under Windows NT, the base machine's operating system is Windows NT 4.0.

KNOWLEDGE SUCKS.

All that stuff on your computer. It's enough to drive you mad.
Where'd you put it? What'd you call it? What's it look like?
Who knows?

We do.



Ask The Fish.
www.enfish.com/tryit

Choose 016 at www.pcmag.com/infolink

Introducing PANTONE OfficeColor Assistant™

NOW MATCH CORPORATE COLORS IN MICROSOFT® WORD, EXCEL AND POWERPOINT.



Finally, professional color for Microsoft Office users. Until now, matching corporate colors in PowerPoint or other Office applications was literally trial and error. At last, PANTONE OfficeColor Assistant delivers what you need. Professional full-color bandwidth: more than 1,000 precision PANTONE Colors you can select by number*, right from within your applications. Never again settle for a color that's almost right; get it perfect. Get PANTONE OfficeColor Assistant and color coordinate your office today.



The PANTONE MATCHING SYSTEM® is the recognized international standard for color matching.

PANTONE OfficeColor Assistant
PANTONE Colors for
Microsoft Office 97/98 **\$29.95**

Free trial download:
www.pantone.com/officecolor/

To order:
call 888-PANTONE
or visit www.pantone.com

PANTONE®

HOW THE WORLD AGREES ON WHAT IT SEES™

Choose 397 at www.pcmag.com/infoink



WINBENCH 99

The hard part in creating a benchmark such as WinBench 99 is making sure its tests really do act like the applications they are supposed to reflect. WinBench 99 primarily uses ZD's proprietary *playback* technology to do this. The playback tests in WinBench 99 play back the actual subsystem-level Windows calls that Winstone 99 applications made while executing the Winstone scripts.

WinBench 99 provides both Business and High-End versions of each of its familiar Graphics WinMark and Disk WinMark tests. WinBench 99 also continues to offer tests of the performance of a PC's processor and RAM, DirectDraw, and full-motion video subsystems.

WinBench 99 produces Graphics scores corresponding to each of the overall and individual scores Winstone 99 produces. The scores are all relative to those of the same base machine Winstone 99 uses. The Graphics WinMark scores, however, are by no means the same as any of Winstone 99's scores. WinBench 99 produces the Graphics WinMark by running a series of practically nonstop graphics stress

tests; the applications in Winstone 99 inter-seperse graphics, disk, and processor work.

The Disk WinMark, like the Graphics WinMark, comes in both Business and High-End versions. WinBench 99's Disk WinMark 99 tests play back all the timed application disk activity in Winstone 99. In the course of these operations, the tests use many directories and hundreds of files that touch approximately 200MB of disk space.

Last year, a new file-cache-enhancing driver, Disk Performance Monitor from Genesis One Technologies (IOS0.VXD), exploited the difference in working-set size between Winstone and WinBench. That driver used much more of the RAM not in use by WinBench 99 to enlarge its disk cache and thus rack up huge Disk WinMark scores. This year we've changed the memory footprint of both the

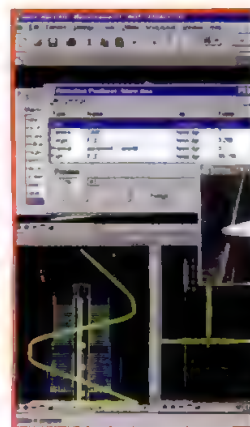
Disk WinMark and the CD WinMark tests so they are about the same as the footprints of the Winstone tests and thus give accurate scores with or without cache enhancement.

WinBench 99's new transfer-rate test lets you measure the transfer rate of hard disks, DVD-ROM drives, and CD-ROM drives. And it actually lets you see the results as it obtains them.

WinBench 99 also includes a new test specifically designed to measure the performance of

small media drives, such as the Iomega Zip Drive, by playing backup activity. And WinBench 99 also provides a processor subsystem performance test, called CPUmark₃₂. As you'd expect, CPUmark₃₂ is a 32-bit test that reflects the processor usage of 32-bit applications like those in Winstone 99.

You may find it tempting to try in some way to combine the CPUmark₃₂, Business Disk WinMark 99, and Business Graphics WinMark 99 results and to equate the result with the Business Winstone 98 score. That approach won't work. The way those subsystems interact is an important part of a system's performance and thus of its overall Winstone 99 score. Winstone 99 takes all of this into account. The WinBench 99 scores, by contrast, focus on individual subsystems.



The new WinBench 99 data transfer test graphically shows how fast the device being tested is transferring data at every point on the volume.

CD WINBENCH 99

CD WinBench 99 puts all of the WinBench CD-ROM tests on a CD by themselves. This lets us keep the benchmark in packaging that will not in any way affect the CD-ROM, so we can ensure that our CD-ROM tests will run accurately on the fastest and most finicky CD-ROM devices on the market. Problems with a few of last year's CDs motivated us to make this change.

We've also updated last year's CD-ROM Disk Transfer Rate, Access Time, and CPU Utilization tests to work with any data, whether CD-ROM or DVD-ROM (though they

Highlights of the New PC Benchmark Tests

Winstone 99's test scripts measure PC performance by exercising nine leading business applications and seven high-end apps.

- Winstone 99's Business application tests now center on the leading office suites. Each Winstone 99 Business test runs with several applications in a suite loaded simultaneously, thus better modeling how people work today.

- Winstone 99 includes a new test whose scripts exercise MicroStation SE, Adobe Photoshop 4.0, and Microsoft Visual C++ to measure how much the second processor in such a system actually boosts application performance.

- Winstone and the other PC benchmark tests now offer the option of automatically retrying tests that fail after a broad class of errors.

- All the tests in both Winstone 99 and WinBench 99 are fully 32-bit programs, which communicate with a shared set of user-interface

components via a Component Object Model (COM) interface.

- Almost all of the PC benchmark tests run on Microsoft Windows 95, Windows 98, and Windows NT. The exceptions are the Winstone 98 High-End tests, which run only on Windows NT.

- 3D WinBench 99's total performance and quality measure, the 3D WinMark 99, reflects the demands of both today's and tomorrow's 3-D applications.

- 3D WinBench uses many of the new features in DirectX 6.

- To compute the 3D WinMark 99, 3D WinBench 99 displays a series of gamelike scenes of varying complexity and quality levels.

- 3D WinBench's improved quality verification suite helps you evaluate whether a 3-D adapter correctly implements a wide variety of 3-D rendering features, and new testing automation tools make that task easier than ever before.

- CD WinBench 99 provides a broad set of CD-ROM performance testing tools in a single new benchmark test.

won't work with music CDs or movie DVDs). Like WinBench 99, CD WinBench 99 includes the new transfer rate test mentioned above.

We logged the CD activity of a new set of applications to create the CD-ROM WinBench test: Compton's 3D World Atlas Deluxe; JumpStart Kindergarten; Microsoft Encarta 98 Encyclopedia Deluxe Edition; Microsoft Office 97 Professional Edition (We logged the installation process); Quake II; Riven; The Se-

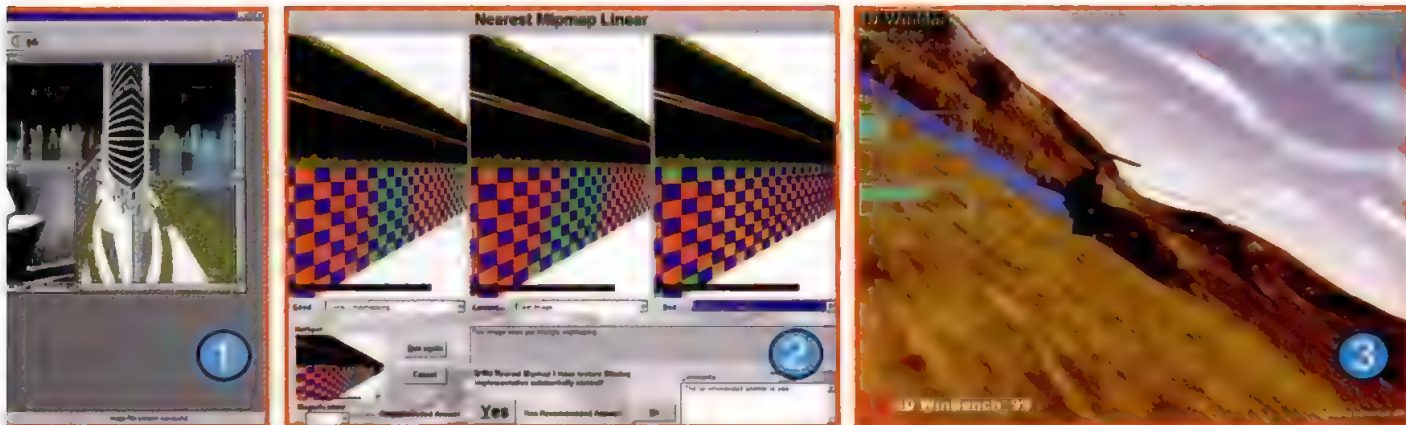
quel to Myst; and Rand McNally Trip-Maker Deluxe 98.

the time-out period. If the program cannot determine whether an implementation is clearly acceptable it will not automatically reject the implementation. Instead, it will stop the test and recommend rejection. The tester then must make the ultimate decision to reject an implementation. The benchmark test also offers a fully automated mode, in which it automatically accepts all of its own recommendations.

The program still requires you to run the

This approach is similar to what games do and allows 3D WinBench 99 to include buffer flips in its performance measurement.

The 3D WinMark 99 suite includes new scenes that are more gamelike in appearance and function than those in 3D WinBench 98. The scenes have significant amounts of pixel blending and multitexture rendering and less Gouraud shading than in 3D WinBench 98. All 3D WinMark tests require bilinear



quel to Myst; and Rand McNally Trip-Maker Deluxe 98.

3D WINBENCH 99

One of the most important aspects of testing a 3-D accelerator is accurately determining exactly which 3-D features that accelerator implements correctly. 3D WinBench 99 measures 3-D performance and helps you assess 3-D quality.

3D WinBench 99 attempts to determine which rendering features an accelerator and its driver support the same way games do: by querying Direct3D. To help our testers (and you) verify that a 3-D accelerator actually does correctly provide all the rendering options it claims, 3D WinBench 99 provides a large 3D Quality suite. Each of the more than 50 displays in this suite shows you how a scene should appear if an accelerator implements the associated features correctly, and then you can compare that image to the one your accelerator provides. The suite also provides a facility that can, at your option, automatically determine if the implementation is acceptable or not. The quality-test automation will pass only implementations that meet very strict performance criteria; ZDBoP built the quality-test automation tools to avoid false positives.

In the default automation mode, the program will automatically accept conforming implementations after a short time-out. The tester may override the benchmark program during

1. High-End Winstone 99's test scripts, such as the MicroStation SE test in this figure, are more demanding than ever.

2. 3D WinBench 99's improved quality tests let you examine samples of good and bad 3-D images and compare them with images the card being tested has produced.

3. 3D WinBench 99's tests include new scenes, which employ such features as pixel blending and multitexturing. This scene uses light maps and detail maps for the ground and pixel blending in the sky.

quality tests in the 3D Quality/WinMark suite before you can run the 3D WinMark 99 tests.

Unlike last year's version, 3D WinBench 99 no longer falls back to the software emulator if the HAL cannot support a feature. Practically speaking, there's no reason to fall back to software any longer. Most modern HALs are significantly more feature-laden than the software emulator. In addition, the software emulator is simply too slow to be useful in real-time games.

Other significant differences between 3D WinBench 98 and 3D WinBench 99 include:

3D WinBench 99 uses the Vertex Buffer interface in Microsoft's new DirectX 6. While the test requires that DirectX 6 be on the PC you're testing, it will work with DirectX 5 device drivers. (Some of DirectX 6's new features, such as support for multitexture hardware, will not be available with DirectX 5 drivers.)

3D WinBench 99 uses triple- (or double-) buffered rendering instead of the front-buffer-only rendering in 3D WinBench 98.

mipmapping and source alpha pixel blending as baseline features. All new 3-D chip sets should be able to run all of the 3D WinMark 99 tests.

3D WinBench 99 includes two processor tests that use the DirectX 6 null device driver. One of these tests measures the processor's ability to transform and light vertices, and the other measures only transformation.

The texture requirements of the 3D WinMark 99 tests are significantly greater than those of 3D WinMark 98. In the 98 version, only two tests required more memory than what is available in a 4MB frame buffer at 640-by-480. 3D WinMark 99, by contrast, includes many tests that will not fit in the 2MB left in an 8MB frame buffer at 1024-by-768 using triple buffering.

The standard for 3D WinBench testing this year is 8MB of RAM on the graphics adapter. An adapter's fill rate plays a greater role in its 3D WinMark score, as it does in games.

The standard test settings we will use include

- full screen 1,024-by-768 resolution,
- triple buffering,
- 16 bits of color per pixel,
- 16 bits of z per pixel, and
- an 85-Hz refresh rate.

These settings require 8MB of frame buffer in traditional architectures. The 3D WinBench 99 help file also contains some standard test settings for 4MB cards.



Although new 3-D graphics chip sets should run all of the 3D WinMark tests, some older chip sets will fail some tests due to lack of certain pixel-blending modes (for example, the RIVA128 does not support modulate2x, and the Permedia 2 does not support modulate or modulate2x). When you're using it to compare adapters based on the newest chip sets, therefore, the 3D WinMark is essentially a performance measurement. When you use it on older chip sets that cannot run all of the 3D WinMark tests, the 3D WinMark score also effectively includes a measure of the 3-D feature set.

SAME TIME NEXT YEAR

By the time you read this, ZDBOp will already be hard at work on next year's PC benchmark tests. When the programs are ready, we'll debut them in these pages. 

Mark L. Van Name is vice president, product testing at ZD. Eric Hale is the director of ZDBOp.

How to Get Copies of the New Tests

You can download a copy of 3D WinBench 99 from www.zdbop.com. You can also download a copy of WinBench 99 from the same place, but this online version is incomplete. Specifically, it does not contain the graphics or video performance tests; those tests and the files they require are too large. CD WinBench requires our test CD and so is not available for download. Winstone 99, at over 250MB in size, is also not available for download. To get those benchmarks, you will need to order the CD-ROMs that contain them.

The PC benchmark tests come on three CD-ROMs. One holds Winstone 99, and the second contains complete versions of WinBench 99, 3D WinBench 99, and Audio WinBench 99. CD WinBench 99 occupies the final CD. ZDBOp will mail you a copy of any or all of these CD-ROMs for \$5.00 (U.S., \$6 Canada, \$7 international) for each CD. To order these CDs, use the order form accessible from the ZDBOp home page or fax your request to 919-380-2879. You can also send a postcard to the following address:

Ziff-Davis Benchmark Operation
1001 Aviation Parkway, Suite 400
Morrisville, NC 27560
Attn.: Distribution Coordinator

Please include with all requests your name, address, phone number, Visa or MasterCard number, the list of CD-ROMs you want, and a note that you are willing to pay the required shipping and handling fee. Please allow two to three weeks for delivery. If you'd like faster delivery, enclose your Federal Express account number and shipping instructions; please note, though, that Federal Express orders are still subject to the shipping and handling fee. Each CD includes online documentation for the benchmark test(s) it contains.

SAVE ON



GO TO

<http://subscribe.pcmag.com/free>

and get 22 Issues a year plus a FREE Bonus Gift!



DIRT CHEAP DRIVES

1-800-786-1173

WWW.DIRTCHEAPDRIVES.COM

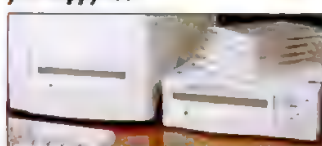
Celebrating our 10th year!
Low Low Prices!



Fast Service

We stock what we sell and ship via Fed Ex for speedy delivery.

Satisfied Customers
We have been making happy customers for over a decade. A large percentage of our business is from repeat customers. So assured that we will make you happy too.



BEST BUY CD RECORDERS
TOLL FREE SUPPORT
5 FREE DISKS
Call for new 4x6 Rewritable!

- 4x12 SCSI CD ROM RECORDER**
- Packet write compatible
 - Tray loading
 - Drive Kit \$259
 - Complete Kit with ISA controller \$309
 - Complete Kit with PCI controller \$359
- 4x12 SCSI CD ROM RECORDER**
- Packet write compatible
 - Tray loading
 - Drive Kit \$369
 - Complete Kit with ISA controller \$419
 - Complete Kit with PCI controller \$469
- 8x20 SCSI CD ROM RECORDER**
- Packet write compatible.
 - Tray loading
 - Drive Kit \$699
 - Complete Kit with ISA controller \$749
 - Complete Kit with PCI controller \$799
- 4x24 SCSI CD ReWritable!**
- CD-R & CD-RW compatible
 - Yamaha mechanism
 - Includes 5 rewritable disks
 - Drive Kit \$349
 - Complete kit with PCI controller \$449
 - (Add \$90 for external version. Drive kit - requires controller)

We will not be undersold on CD media!

CD-R 74 (with jewel case) Alone w/CDR

Budget 5 pack (CDR74B-5) \$19 \$17

Budget 20 pack (CDR74B-20) \$36 \$33

Budget 50 pack (CDR74B-50) \$74 \$70

Budget 100 pack (CDR74B-100) \$139 \$129

CD-R 74W (Rewritable)

Budget 5 pack (CDR74WB-5) \$33 \$33

Budget 20 pack (CDR74WB-20) \$129 \$125

We also carry Printable media, Platinum media, and BX Certified Media. CDR Media Color Printer \$399



Converts any 3 1/2" hard drive into a removable drive. Great for transportability, data interchange, or security needs. Mount any 3.5" IDE or SCSI drive in the supplied cartridge, and the frame in a 5.25" drive bay in your computer and you are ready for transportability. Extremely high quality construction. Features built in cooling fan, SCSI ID switch

IDE	\$79	Extra frame	\$49	Extra cartridge	\$39
SCSI	\$85		\$54		\$40
Ultra Wide SCSI	\$129		\$80		\$69
Weather resistant cartridge carrying case					\$30

The Drive Cooler
Keep your drives running cool with The Drive Cooler. Thermistatically Controlled Cooling System makes them fans respond to warming temperatures of drives by moving more air. \$30

Complete Smart Storage Solutions DVD-3 kit with MPEG-2 decoder, 3rd gen DVD reader & 32X CD ROM IDE interface. Only \$239

ULTRA IDE HARD DRIVES

QUANTUM	Size	Speed	Model	Price
256MB	9.5ms	5400	FB302500A	\$119
322MB	9.5ms	5400	FB303200A	\$125
401MB	12ms	4000	BF4000A	\$132
513MB	9.5ms	5400	FB305100A	\$152
602MB	12ms	4000	BF6000A	\$158
644MB	9.5ms	5400	FB306400A	\$172
769MB	9.5ms	5400	FB307600A	\$187
803MB	12ms	4000	BF8000A	\$181
1026MB	9.5ms	5400	FB310200A	\$237
1205MB	12ms	4000	BF1200A	\$239
1275MB	9.5ms	5400	FB312700A	\$285
1900MB	10.5ms	4000	BF1900A	\$319

IBM	Size	Speed	Model	Price
840MB	9.5ms	5400	IBM48GP	\$209
1010MB	9.5ms	5400	IBM10GP	\$245
1010MB	9.5ms	7200	IBM10GXGP	\$279
1290MB	9.5ms	5400	IBM12GP	\$325
1440MB	9.5ms	7200	IBM14GXGP	\$415
1680MB	9.5ms	5400	IBM16GP	\$415

MAXTOR	Size	Speed	Model	Price
340MB	9ms	5400	M90340D	\$135
680MB	9ms	5400	M90680D	\$172
750MB	9ms	7200	M90750D	\$230
1000MB	9ms	7200	M91000D	\$269
1360MB	9ms	5400	M91360D	\$305

SEAGATE	Size	Speed	Model	Price
322MB	11ms	4500	ST33221A	\$128
432MB	11ms	5400	ST34321A	\$140
653MB	9.5ms	7200	ST36530A	\$200
653MB	11ms	5400	ST36531A	\$170
866MB	10ms	5400	ST38661A	\$199
914MB	9.5ms	7200	ST39140A	\$250
1020MB	11ms	5400	ST310240A	\$280

WESTERN DIGITAL	Size	Speed	Model	Price
324MB	11ms	5400	AC23200	\$134
431MB	9.5ms	5400	AC24300	\$144
644MB	9.5ms	5400	AC36400	\$178
840MB	9.5ms	5400	AC38400	\$219
1010MB	9.5ms	5400	AC310100	\$289

SCSI HARD DRIVES

Add an Adapter A2440 PCI Ultra SCSI controller for \$180

SCSI	RPM	Brand	Model	Price
211MB	5400	Quantum	FB32100S	\$205
322MB	5400	Quantum	FB32200S	\$235
431MB	5400	Quantum	FB34300S	\$269
436MB	7200	Western Digital	WD4360N	\$379
452MB	7200	Seagate	ST34520N	\$255
470MB	7200	Seagate	ST34733N	\$450
455MB	7200	IBM	IBM34560N	\$289
644MB	5400	Quantum	FB36400S	\$352
653MB	7200	Seagate	ST36530N	\$360
845MB	5400	Quantum	FB38400S	\$455
910MB	5400	IBM	IBM39130N	\$525
910MB	7200	Quantum	XP39100S	\$519
910MB	7200	Western Digital	WD9100N	\$529
914MB	7200	Seagate	ST39140N	\$467
919MB	7200	Seagate	ST39173N	\$525
1000MB	7200	IBM	IDGH518Z	\$1019
1182MB	7200	Seagate	ST118273N	\$1109
1820MB	7200	Quantum	XP318200S	\$969

ULTRA WIDE SCSI HARD DRIVES

Add an Adapter PCI Ultra Wide SCSI controller for \$199

WIDE	RPM	Brand	Model	Price
431MB	7200	Western Digital	WD4360W	\$379
452MB	7200	Seagate	ST34520W	\$273
455MB	7200	IBM	IBM34560W	\$299
455MB	7200	Quantum	VK304550W	\$285
455MB	7200	Seagate	ST34573W	\$484
653MB	7200	Seagate	ST36530W	\$376
910MB	7200	Quantum	VK309100W	\$475
910MB	7200	Western Digital	WD9100W	\$529
910MB	5400	IBM	IBM39130W	\$525
910MB	7200	IBM	IDGH509U	\$569
910MB	10,020	IBM	IDGV59U	\$629
914MB	7200	Seagate	ST39140W	\$499
919MB	7200	Seagate	ST39173W	\$599
1060MB	7200	IBM	IDGH518U	\$1019
1820MB	7200	Seagate	ST118273W	\$1017

ULTRA-2 SCSI A/V HARD DRIVES

WIDE	RPM	Brand	Model	Price
455MB	7200	Quantum	VK304550LV4	\$319
910MB	7200	Quantum	VK309100LV4	\$509
1820MB	7200	Quantum	XP318200LV4	\$999

ULTRA-2 SCSI HARD DRIVES w/ 4MB Cache!

WIDE	RPM	Brand	Model	Price
910MB	10,000	Seagate	ST39102LV4	\$809
1820MB	10,000	Seagate	ST118202LV4	\$1449

We also carry a full line of SCA and FC-AL drives, controllers, RAID, enclosures, mounting hardware, and cables. Check us out at:

DIRTCHEAPDRIVES.COM

ULTRA-2 SCSI HARD DRIVES

80MB Sec. Add an Adapter PCI Ultra-2 SCSI controller for \$389

WIDE	RPM	Brand	Model	Price
455MB	7200	Seagate	ST34573LV	\$475
455MB	7200	Quantum	VK304550LV	\$289
455MB	10,000	Seagate	ST34502LV	\$522
910MB	10,000	Seagate	ST39102LV	\$690
910MB	7200	Quantum	VK309100LV	\$479
910MB	7200	Quantum	XP309100LV	\$519
919MB	7200	Seagate	ST39173LV	\$545
1820MB	7200	Seagate	ST118202LV	\$1039
1820MB	10,000	Seagate	ST118202LV	\$1299
1820MB	7200	Quantum	XP318200LV	\$969

CD ROM DRIVES

IDE CD ROM	Speed	Brand	Model	ms	Int
32X	NEC	CDR1900	80	\$64	
32X	Mitsumi	CRMFC32X	85	\$65	
32X	Teac	CD532E	85	\$67	
32X	Toshiba	XM6202B	80	\$69	
36X	Pioneer	DRU704	70	\$69	
40X	NEC	CDR3000	75	\$87	

IDE CD CHANGERS

Speed	Brand	Model	# Disks	Int
16X	Nakamichi	MJS16A	5	\$145

Above also available as kit - includes drive, controller & data cable for \$30 more. Call for external package.

ACCESSORIES

Buy a CD drive & source card & get a FREE audio cable.
Creative Labs Sound Blaster AWE64 (SB64VALUE) \$95
Creative Labs Sound Blaster AWE64 (SB64AWE64GOLD) \$139
New! PCI 128 Sound Blaster \$75
Professional speakers with Bose style swirl speakers and separate subwoofer
25 Watt (SPEAKER) \$99 35 Watt (SPEAKERPRO) \$129
Universal sound cable (AUDIO MIX) \$9
Need to turn an internal into an external? Call us!

SCSI CD ROM

Speed	Brand	Model	ms	Int
24X	NEC	CDR1810	85	\$87
32X	NEC	CDR1910	85	\$89
32X	TOSHIBA	XM6201B	85	\$99
32X	Teac	CD532S	85	\$109
32X	Plexstor	PK32TS (scan)	85	\$149
32X	Plexstor	PK32TS (cache)	85	\$189
36X	Pioneer	DRU706S	70	\$95

SCSI CD CHANGERS

Speed	Brand	Model	# Disks	Int
16X	Nakamichi	MJS16	5	\$199
24X	Pioneer	DRM324X	Ext 6 Disk	\$419

Call for SCSI & Ethernet CD multiride Towers

CD RECORDERS

Mitsumi IDE 2x8	Int/Ext Hot Port w/ st & 1 disk (CRM2800TE/2801TE)	\$299/\$389
Mitsumi 4x8	Int/Ext Hot Port w/ st & 1 disk (CRM4800TE/4801TE)	\$299/\$429
Samsung IDE 2x16 Rewritable	Int/Ext Hot Port w/ st & 1 disk (SCW230E/SCW230E)	\$269/\$399
Matsushita / Panasonic 4x8	Int/Ext SCSI (CDR7502B/CDR7502BX)	\$249/\$339
Teac 4x12	Int/Ext SCSI (CDR55S/CDR55SX)	\$339/\$429
Int kit w/ controller, software, 1 disk (CDR55SX)		\$429
Plexstor 4x12	Int/Ext IDE (PXWRITER/PXWRITERX)	\$349/\$439
Int kit w/ controller, software, 1 disk (PXWRITERX)		\$419

CD RE WRITERS

Hewlett Packard 4x24x24 CD ReWritable	CD-Writer Plus 8100, writes to CDR (write once) or CDRW (rewritable) media. Packet write, 1MB buffer, tray load. 1 CD-R & 1 CD-RW disk IDE int w/ st (C4392A)/Ext hotport. (C4392HP)	\$339/\$469
Yamaha 4x24x24 CD ReWritable	Bare Internal/Bare Ext SCSI (YCDR4260/2X)	\$289/\$379
Int SCSI kit w/ controller, software, 1 disk (YCDR4260P)		\$369
8x20 CD ReWritable w/ 2MB BUFFER!	Int w/ st & 1 disk (CDR8X20S)	\$699
Int w/ ISA controller, st & 1 disk (CDR8X20SK)		\$749
Ext w/ st & 1 disk (CDR8X20SK)		\$789
4x4x16 CD ReWritable by Yamaha NEW!	Int/Ext SCSI (YCRW4416S/YCRW4416SX)	\$349/\$439
Int/Ext IDE (YCRW4416E/YCRW4416HPX)		\$349/\$519
Int SCSI w/ controller, st, 1 RW disk (YCRW4416LT)		\$389
Int IDE w/ software, 1 RW disk (YCRW4416EK)		\$389
4x4x20 CD ReWritable by Ricoh NEW!	Int IDE tray load, 2MB buffer (MP7040A)	\$319
Int w/ st & 1 disk (MP7040AK)		\$359
Ext w/ st & 1 disk (MP7040AKHP)		\$489

*Must be purchased with CDR software or media.

Check out our unbeatable deals on CD duplicators at dircheapdrives.com/deps. We also have a full selection of DVD recorders at dircheapdrives.com/dvrm



Color CD Printer
High quality color printing on printable media. Gives a more professional image to your CDs. \$999

TAPE DRIVES

JOMEGA DITTO MAX		
7Gig DITTO MAX Internal		\$189
7Gig DITTO MAX External Parallel Port		\$189
Compatible with 5GB, 5GB, and 7GB tapes. Int. Ind. Dito Dash		
10Gig DITTO MAX PRO		\$289
10Gig DITTO MAX PRX Ext Parallel Port		\$280
Compatible with 5GB, 5GB, and 10GB tapes. Int. Ind. Dito Dash		
Tapes 5GB 5mm 1/2 5GB 5mm 1/2 7GB 5mm 1/2 10GB 5mm 1/2		

EXABYTE		
7-14Gig 8mm, 120MB/min, ELIANT820		\$1329
7-14Gig 8mm, 60MB/min, EXB8700LT		\$519
7-14Gig 8mm, 60MB/min, EXB8700SW		\$819
20-40Gig 8mm, 360MB/min, EXB8900		\$2679
70-140Gig 8mm, 60MB/min, EXB10H		\$3999

HEWLETT PACKARD

2-4Gig DAT-DC, 42MB/min, C1536AI		\$449
4-8Gig DDS-2 DAT, 60MB/min, C1599AI		\$729
12-24Gig DDS-3 DAT, 120MB/min, C1554AI		\$959
72-144GB DDS-3 DAT, 120MB/min, C5648A		\$2699

SEAGATE

2-4Gig DAT-DC, 66MB/min, STD24000N		\$519
4-8Gig DDS-2 DAT, 66MB/min, STD28000N		\$659
12-24Gig DDS-3 DAT, 132MB/min, STD22400N		\$869
25-50Gig AT, 360MB/min, STA250000W		\$2449

SEAGATE MINI CART

4-8Gig TR4, STT28000A IDE		\$195
4Gig TR4, STT28000N SCSI		\$219
4-8Gig TR4, STT28000C SCSI		\$Cali
4-8Gig TR4, External STT28000X SCSI		\$360

SONY

4-8Gig DDS-2 DAT, 90MB/min, SDT7000AI		\$559
12-24Gig DDS-3 DAT, 144MB/min, SDT9000AI		\$759
32-64Gig DDS-2 DAT, 90MB/min, TSL7000		\$1899

QUANTUM

100-200Gig DLT loader 180MB/min, DLT4500	\$3999
100-200Gig DLT loader 180MB/min DLT4500R (Rackmount)	\$3799
140-280Gig DLT loader 180MB/min, DLT4700	\$5699
140-280Gig DLT loader 180MB/min, DLT4700R (Rackmount)	\$5499

CTX? You're going places, boy!

They don't make 'em like they used to. CTX makes 'em better. High-quality CRT displays. Leading-edge LCD monitors and projectors. Award-winning notebooks. And powerful desktops. Those CTX products are solid. And recognized internationally from Europe to Asia for their value and performance. Even the Minister of Economic Affairs, Republic of China, honored the EX1200, PR710, and VL700S monitors with the "It's Very Well Made in Taiwan" excellence award.

'Course, you'd expect nothing less. What with 12 years experience and nearly a billion dollars in annual sales. Heck, they build stuff in their very own factories. So it's about as reliable as you can get, nowadays.

Quality. Reliability. And service like it should be. With prices that won't scare the bejeachers out of you. Yep. Go with CTX and you'll go a long way, sonny boy. 800-888-2120



VL700S, PR710, EX1200

www.ctxintl.com

© 1999 CTX International, Inc. All rights reserved.

Visit us at COMDEX Fall, Las Vegas, Booth #L6662

CTX

COMMITTED TO XCELLENCE
Choose 012 at www.pcmag.com/infolink

AXIS



Get a PC Magazine Editors' Choice for \$995

*"The Best
Combination of
Price, Performance,
and Features"*

That's what PC Magazine said when it selected our Axis Orion LXN as the Editors' Choice in its recent round up of 37 Value PC's. But we've already known that. In fact, that is what we set out to do with every system that we design and build. Because we know that's what you're looking for. And we know that's what it takes to earn your business.

Check out our latest high performance machines featuring the Intel Pentium II 450MHz Processor, with optional features like 4.8X DVD-ROM drives, 13.6GB hard drives, and Diamond's new Viper V550 3D graphics. These systems will burn a hole on your desktop! And starting at just \$1295! You owe it to yourself to get one of these.

So if you're looking for a computer maker to cut the corners to sell you a cheap system, you should turn the page. Otherwise, check out what we have to offer here, or go to our website and customize one of your own; either way, **We've Got the System For You.**

BUSINESS HOURS

Sales

Mon-Fri, 8A.M. - 8P.M. PST
Sat & Sun, 9A.M. - 5P.M. PST

SUPPORT

24 Hours/7 Days

AXISORION LXN

- 333MHz Intel Pentium II MMX Processor
- 64MB SDRAM
- 6.4GB Ultra DMA Hard Drive
- 512K L2 Cache
- Intel 440LX AGP Set
- 1.44MB 3.5" Floppy Drive
- Intel i740 8MB 3D 2X AGP Graphics Accelerator
- Toshiba 32X Max CD-ROM Drive
- Creative Labs Ensoniq Audio PCI 3D Wavetable Sound Card
- Altec Lansing ACS44 Speakers with Subwoofer
- Diamond Supra 56K V.90 PCI Voice/Data/Fax Modem
- Microsoft Windows 98
- 104 Keyboard, Microsoft Intellimouse
- 2 Serial, 1 Parallel, 1 Game, and 2 USB Ports
- 3 Year Parts & Labor Warranty
- 1 Year On-Site Service, Lifetime Toll Free 24/7 Tech Support

\$995

Pentium II 300MHz MMX \$955

- Add a 15" (13.8vis) .28 Monitor, \$159
- Add a 17" (15.7vis) .28 Monitor, \$249
- Add an Iomega 100MB Zip Drive, \$89
- Call for optional software bundles

AXISORION LXN DVD

- 400MHz Intel Pentium II MMX Processor
- 64MB PC100 SDRAM
- 8.4GB Ultra DMA Hard Drive
- 4.8X DVD/32X Max CD-ROM Drive
- 512K L2 Cache
- Intel 440BX AGP Set
- 1.44MB 3.5" Floppy Drive
- Intel i740 8MB 3D 2X AGP Graphics Accelerator
- Yamaha SoftSynth PCI 3D Wavetable Sound Card
- Altec Lansing ACS44 Speakers with Subwoofer
- Lucent Technology 56K V.90 PCI Voice/Data/Fax Modem
- Microsoft Windows 98
- 104 Keyboard, Microsoft Intellimouse
- 2 Serial, 1 Parallel, 1 Game, and 2 USB Ports
- 3 Year Parts & Labor Warranty
- 1 Year On-Site Service, Lifetime Toll Free 24/7 Tech Support

\$1225

Pentium II 350MHz MMX \$1055
Pentium II 450MHz MMX \$1395

- Add a 17" (15.7vis) .26 Monitor, \$289
- Add a 19" (18.0vis) .26 Monitor, \$489
- Add an Iomega 100MB Zip Drive, \$89
- Call for optional software bundles

AXISORION LXN DVD

- 450MHz Intel Pentium II MMX Processor
- 128MB PC100 SDRAM
- 11.5GB Ultra DMA Hard Drive
- 4.8X DVD/32X Max CD-ROM Drive
- 512K L2 Cache
- Intel 440BX AGP Set
- 1.44MB 3.5" Floppy Drive
- Matrox Millennium G200 3D 2X AGP Graphics Accelerator
- Creative Labs Ensoniq Audio PCI 3D Wavetable Sound Card
- Altec Lansing ACS44 Speakers with Subwoofer
- Lucent Technology 56K V.90 PCI Voice/Data/Fax Modem
- Microsoft Windows 98
- 104 Keyboard, Microsoft Intellimouse
- 2 Serial, 1 Parallel, 1 Game, and 2 USB Ports
- 3 Year Parts & Labor Warranty
- 1 Year On-Site Service, Lifetime Toll Free 24/7 Tech Support

\$1595

Pentium II 350MHz MMX \$1255
Pentium II 400MHz MMX \$1425

- Add a 17" (15.7vis) .26 Monitor, \$289
- Add a 19" (18.0vis) .26 Monitor, \$489
- Add an Iomega 100MB Zip Drive, \$89
- Call for optional software bundles

1-800-378-9014 • www.axissys.com

1134 N. Gilbert St., Anaheim, CA 92801, Tel: 714/780-1788, Fax: 714/780-1787, E-mail: sales@axissys.com
©1998 Axis Systems Inc. Pictures may differ from actual products. Prices and specifications are subject to change without notice.

Choose 010 at www.pcmag.com/infolink

**YOUR
brands.
YOUR way.
NEXT
day.**

DESKTOPS/TOWERS

Acer

AcerPower Systems

50713	PII333/32MB/5.1GB/24X	\$1099
50714	PII350/32MB/5.1GB/32X	\$1139
104483	300ACeleron/32MB/4.3GB/32X/56K/W98	\$999*

COMPAQ

Compaq Desktop 6000

49068	233PII/32MB/2.1GB/24X/10/100/WinNT	\$899
-------	------------------------------------	-------

Compaq Deskpro EP & EP SBS Towerable Desktop

102353	300ACeleron/32MB/4.3GB	\$899
102355	333Celeron/32MB/4.3GB	\$949
102356	333Celeron/64MB/6.4GB/32X	\$1269
102357	350PII/64MB/6.4GB/32X	\$1278
102358	350PII/64MB/10GB/32X	\$1629
102359	400PII/64MB/10GB/32X	\$1779
102360	450PII/64MB/10GB/32X	\$1899

Compaq EN Desktop

102341	300ACeleron/32MB/3.2GB	\$1099
102285	333Celeron/32MB/3.2GB/10/100	\$1225
102344	333Celeron/32MB/3.2GB/32X	\$1149
102291	350PII/64MB/10GB/10/100/WinNT	\$1749
102280	300ACeleron/32MB/3.2GB/10/100	\$1189
102347	400PII/32MB/6.4GB	\$1549
102294	450PII/64MB/10GB/10/100/WinNT	\$2129
102348	450PII/64MB/9.1GB/32X/WinNT	\$2099

Compaq EN Minitor

102343	300ACeleron/32MB/3.2GB/32X	\$1225
102346	333Celeron/32MB/6.4GB/32X	\$1379
102288	333Celeron/32MB/3.2GB/32X/10/100	\$1479
102296	450PII/64MB/6.4GB/32X/10/100/WinNT	\$2099

HEWLETT PACKARD

Hewlett-Packard Brio

102177	333Celeron/32MB/4.3GB/32X	\$999
101969	333Celeron/32MB/4.3GB/32X	\$1149
102227	333Celeron/32MB/4.3GB/32X/56K	\$1249
101971	350PII/32MB/8GB/32X	\$1399
102670	450PII/64MB/8GB/32X	\$1949

Hewlett-Packard Vectra

103666	350PII/32MB/3.2GB	\$1199
100959	350PII/32MB/4.3GB	\$1429
101545	350PII/64MB/6.4GB/32X/10/100	\$1879
100968	400PII/64MB/6.4GB/32X	\$1999
50873	400PII/64MB/10GB/32X/10/100	\$2099
103132	450PII/64MB/10GB/32X	\$2399

IBM

IBM PC 300 GL Desktop

50583	350PII/64MB/3.2GB	\$1319
50582	400PII/64MB/3.2GB	\$1569

IBM PC 300 GL Minitor

50580	333PII/32MB/3.2GB	\$1069
50584	350PII/64MB/6.4GB/32X	\$1559
50585	400PII/64MB/6.4GB/32X	\$1899

IBM PC 300PL Desktop

54601	350PII/64MB/6.4GB	\$1759
54602	400PII/64MB/6.4GB	\$1879

IBM PC 300PL Minitor

54606	350PII/64MB/4.2GB	\$1699
54607	400PII/64MB/6.4GB	\$1899

Intevz

Intevz Minitor

103737	300MMX/32MB/3.2GB/24X/56K	\$999
100395	266PII/32MB/4.3GB	\$799
100397	266PII/32MB/4.3GB/Windows NT	\$899
100388	266PII/32MB/4.3GB/32X/56K	\$999

100396	300PII/64MB/6.4GB	\$999
100394	300MMX/32MB/3.2GB/32X/56K	\$799
100385	333MMX/48MB/4.3GB/32X/56K	\$999
100706	333MMX/64MB/6.4GB/32X/56K	\$999
100390	333PII/64MB/6.4GB/32X/56K	\$1199

SONY

Sony VAIO

58143	266PII/32MB/4.3GB/24X/33.6K	\$999
-------	-----------------------------	-------

TOSHIBA

Toshiba Equium

54225	266PII/32MB/4GB/24X/10/100	\$1899
54235	300PII/32MB/4GB/24X/10/100	\$1159

NOTEBOOKS

Acer

Acer Extensa

103763	P266/MMX/32MB/4.1GB/20X/12.1" DS	\$1499
103764	P266/MMX/32MB/4.1GB/20X/12.1" TFT	\$1699
57894	233PII/32MB/2.1GB/24X/56K/12.1" DS	\$1499

COMPAQ

Compaq Armada 1700 Series

103066	233PII/32MB/3.2GB/24X/56K/12.1" HPA	\$1999
50895	233PII/32MB/4GB/24X/56K/12.1" TFT	\$2299
103064	300PII/32MB/5GB/24X/56K/14.1" TFT	\$2499

Compaq Armada 3500 Series

103067	266PII/32MB/4.1GB/12.1" TFT	\$3199
103068	300PII/64MB/6.4GB/13.3" TFT	\$4199

Compaq Armada 7000 Series

102985	300PII/64MB/6.4GB/24X/13.3" TFT	\$3899
102989	300PII/64MB/6.4GB/24X/33.6K/13.3" TFT	\$4099
55276	266PII/64MB/5GB/20X/13.3" TFT	\$3995
102995	300PII/64MB/8GB/DVD/33.6K/14.1" TFT	\$3999

Compaq Presario

102462	266AMD-K6/32MB/4GB/24X/56K/12.1" HPA	\$1899*
102463	266MMX/64MB/4GB/24X/56K/12.1" TFT	\$1999*
102464	300PII/64MB/6.4GB/24X/56K/12.1" TFT	\$2399*
58296	266PII/64MB/4GB/24X/56K/13.3" TFT	\$2799
101785	300PII/64MB/6.4GB/DVD/56K/13.3" TFT	\$3499*

FUJITSU

Fujitsu LifeBook

102051	233PII/32MB/3.2GB/20X/56K/12.1" HPA	\$1499
102054	266PII/32MB/4GB/20X/56K/13.3" HPA	\$1799
102055	266MMX/64MB/4GB/24X/56K/12.1" TFT	\$1999
102056	233PII/32MB/3.2GB/24X/56K/13.3" TFT	\$2399
102059	266PII/32MB/4GB/24X/56K/13.3" TFT	\$2799
102061	300PII/32MB/5GB/24X/56K/13.3" TFT	\$2999

HITACHI

Hitachi VisionBook

50078	233PII/32MB/3.2GB/24X/56K/LAN/12.1" TFT	\$2199
102035	266PII/32MB/4GB/24X/56K/LAN/12.1" TFT	\$2399
100119	266PII/64MB/4GB/24X/56K/LAN/13.3" TFT	\$2999
102033	300PII/64MB/6.4GB/24X/56K/LAN/13.3" TFT	\$3599

IBM

IBM ThinkPad 380

101585	233PII/32MB/4GB/24X/13.3" TFT	\$2159
103308	233PII/32MB/4GB/13.3" TFT	\$2278
101586	300PII/32MB/4GB/24X/13.3" TFT	\$2999

IBM ThinkPad 560

41591	166MMX/16MB/2.1GB/12.1" TFT	\$1199
101593	233PII/32MB/4GB/56K/12.1" TFT	\$2458
101594	300PII/64MB/6.4GB/56K/12.1" TFT	\$3258
101595	300PII/64MB/6.4GB/56K/12.1" TFT	\$3399

IBM ThinkPad 600

54589	233PII/32MB/3.2GB/24X/56K/13.3" TFT	\$2949
100060	233PII/32MB/3.2GB/24X/56K/12.1" TFT	\$2999
54590	266PII/32MB/4GB/24X/56K/13.3" TFT	\$3299
101589	300PII/64MB/5.1GB/24X/56K	\$3958
101590	300PII/64MB/5.1GB/OPE	\$4063

IBM ThinkPad 770

101581	300PII/128MB/8.1GB/56K	\$4999
54596	266PII/32MB/5.1GB/14.1" TFT	\$4558
54597	266PII/64MB/8.1GB/56K/14.1" TFT	\$4958
101582	300PII/128MB/8.1GB/24X/56K/WINNT	\$4998

SHARP

Sharp Actius UltraLite

59797	233MMX/64MB/3.2GB/56K/11.3" TFT/3lbs	\$2499
103002	266MMX/64MB/4.3GB/56K/11.3" TFT/3lbs	\$2799

TOSHIBA

Toshiba Satellite

101103	233PII/32MB/4.1GB/24X/56K/12.1" DS	\$1599
--------	------------------------------------	--------

101104	233PII/32MB/4.1GB/24X/56K/12.1" TFT	\$1899
103394	266PII/32MB/4.1GB/24X/56K/12.1" DS	\$1799

Toshiba Portégé

101101	266PII/32MB/4.3GB/56K/12.1" TFT	\$2995
102877	300PII/32MB/4.3GB/56K/12.1" TFT	\$3399

Toshiba Tecra

101320	233PII/64MB/6.4GB/24X/56K/12.1" TFT	\$2999
101323	266PII/64MB/6.4GB/24X/56K/13.3" TFT	\$3349
102883	300PII/64MB/6.4GB/24X/56K/13.3" TFT	\$3645
102882	300PII/64MB/8.1GB/24X/56K/14.1" TFT	\$4215

HANDHELD PCS

3Com

30153	PalmPilot Professional Edition 1MB	\$229.95
54104	Palm III 2MB, Backlit, Infrared Port	\$49.95

Beepwear

51883	Pager Watch (Ridge Face)	\$99
57121	Pager Watch (Five Point Face)	\$99

Casio

54361	Cassiopea E-10	\$305
-------	----------------	-------

Compaq

59627	C-Series 2015c	\$799
-------	----------------	-------

Cross

52245	CrossPad *Mini 550 version	\$349.95
102534	CrossPad XP 6" x 9"	\$99

Franklin Electronics

101561	REX Pro 5 for Laptops	\$199.95
101562	REX Pro 5-OS for Desktops	\$229.95

Hewlett-Packard

49958	620XL Color Palmtop PC	\$999
50973	660XL Color Palmtop PC	\$999

Philips

55577	Nino 301 4MB w/Dock and Battery	\$349.95
50963	Nino 312 8MB w/Dock, Batt., Modern Coupon	\$399.95
51843	Velo 500 16MB w/Dock	\$499.95*
51844	Velo 500 24MB w/Dock	\$599.95*

Psion

42262	Series 5 Palmtop 8MB	\$499.95
-------	----------------------	----------

Sharp

48446	Mobilion HC-4500	\$649.95
55197	Mobilion HC-4600 16MB	\$699.95
50800	Mobilion HC-4100 (Refurbished)	\$479.95
48489	Digital Camera Card for Mobilion	\$79

MONITORS

Daewoo Electronics

101646	15" S18X	\$119
103044	17" 710B	\$219

EZC International

49292	15" EZ V15000	\$159
49293	17" EZ-P17000	\$249

Hitachi

43329	19" Elite 751	\$699
39084	21" SuperScan Pro 800	\$999

Iiyama

102653	17" VisionMaster Pro 400	\$499
49695	19" VisionMaster 450	\$699
55681	21" VisionMaster 501	\$999

KDS USA

46327	14" VS-4	\$119
46331	15" VS-5	\$139
46332	17" VS-7	\$259

MAG Technology

38384	15" D1530	\$199
36126	17" D1720	\$299
32695	17" DX7001 Technitron	\$399

Mitsubishi

190822	17" Diamond Scan 70	\$399
43361	17" Diamond Pro 87 TDM	\$399
36278	21" Diamond Pro 91TDM	\$1049
190825	NEW! 19" DiamondScan 90E Monitor	\$699

NEC

43812	15" MultiSync A500	\$229
-------	--------------------	-------



SCANNERS

Fujitsu	
52843 ScanPartner 600C SCSI Flatbed w/ADF	\$1399
Hewlett-Packard	
181191 ScanJet 4100 Cse	\$199
49895 ScanJet 5100Cse Flatbed	299
181053 ScanJet 6200 Cse	399
Memorex	
54936 SCF 6120P Flatbed	99.95
54937 SCF 9360P 3D Flatbed	79.95
Microtek	
58485 ScanMaker V310	\$49.95*
57799 ScanMaker X6EL	229.95*
181546 ScanMaker 4	699
Minolta	
46812 Dimage Scan Dual Film Scanner	\$599
Nikon	
55877 Super CoolScan 2000	\$1818
Polaroid	
31224 SprintScan 35 Plus	\$1399
UMAX	
48248 Astra 610S Cross-Platform SCSI Flatbed	\$99.95*
181653 Astra 1220U	129*
54475 Astra 1220S Cross-Platform	149*
40085 Astra 1200S	179*
61167 PowerLook II Duo/Photoshop L.E.	899*
Visioneer	
56577 PaperPort 3100B	\$69.99*
52860 PaperPort 6000B	89.99
40455 PaperPort Strobe Pro	149.99*
83944 PaperPort OneTouch Flatbed	169*

* After mail-in rebate.

DIGITAL CAMERAS

Canon	
57727 PowerShot A5 Digital Camera	\$699
57435 ZR MiniDV Camcorder	995
181674 Vixia MiniDV Camcorder	1495
57434 Optura MiniDV Digital Camcorder	1795
Kodak	
56897 DC220	\$699
56896 DC260	999
Nikon	
53675 Coolpix 900	\$829.99
53674 Coolpix 600	579.99
Olympus	
46391 D-320L	\$399
56672 D-340L	499
47234 D-600L	899
SONY	
59952 Mavica FDS1	\$499
59953 Mavica FDT1	699
183396 NEW! Mavica FD61	799
Toshiba	
100895 PDR-5	\$395
100907 PDR-M1	585

PROJECTORS

Epson	
53877 PowerLite 5000NB LCD Projector	\$4999
InFocus	
101433 LP425 LCD Projector	\$4599
181446 LP735 LCD Projector	5899
Polaroid	
52658 Polaview 211E LCD Projector	\$3999
49917 Polaview 215 LCD Projector	3399

INPUT DEVICES

Adesso	
36224 TriForm Extended Keyboard/TouchPad	\$69.95
21345 TriForm Extended Keyboard PC	44.95
54449 Eagle Touch Keyboard PS/2	12.95
54451 Powermouse Ergonomic PS/2	14.95
32219 NuForm Keyboard w/TouchPad PC	44.95
36217 NuForm Keyboard PC	29.95
Belkin	
58886 USB 3 Button Mouse	\$19.95
58884 USB 104 Key Keyboard	39.95
49333 USB Express Hub	189.95
Cross Pen	
52244 iPen Pro	\$134.95
Good Systems Inc.	
181526 Telesort3 Pro PC TV Converter	\$329.95
35455 Optical Laser PS/2 Mouse	29.95

Kensington Technology Group

25805 Expert Mouse	\$99.95
57065 Mouse in a Box Scroll PC	24.95
39535 Orbit Trackball PC	49.95

Keytronic Corporation

30590 104 Keyboard PS2	\$24.95
40867 Keytronic Classic Keyboard	29.95
57009 Lifetime Mouse PS/2	39.95

Logitech Inc.

182951 Cordless Desktop Keyboard and Mouse	\$89.95
48720 Trackman Marble FX	79.95
54277 Trackman Marble Plus	59.95
45944 MouseMan+	49.95
45949 MouseMan	39.95
45943 First Mouse PS/2	16.95

Marlow Data Systems

32761 105 Keyboard	\$29.95
21457 2-Button Ergonomic Serial Mouse	14.95
21458 2-Button Trackball	24.95

Wacom

181872 Intuos G18	\$289.95
-------------------	----------

MULTIMEDIA

Creative Labs

100196 Sound Blaster LIVE	\$199.95
100142 Sound Blaster 128 Plus 4-Pc. Speakers	149.95
53742 Blaster 32X CD-ROM Drive	69.95
53743 Blaster DVD-ROM Drive	149.95
45900 PC DVD Encore Dxt2	219.95
53366 3D Blaster Voodoo 2 12MB PCI	239.95

DATA STORAGE

Hewlett-Packard

100153 Surestore 8110i CD-Writer Plus Ext.	\$399
181297 CD-R Media (50 Pack)	89.95
48133 5GB Colorado Int. Tape Drive w/Tape	199
48173 5GB Colorado Ext. Tape Drive w/Tape	249
49909 24GB Surestore Dat 24 DDS-3 Int.	1999
49907 24GB Surestore Dat 24e DDS-3 Ext.	1229

Iomega

182641 Zip Drive Parallel Ext.	\$119.95
182640 Zip Drive SCSI Ext.	119.95
46889 Zip Drive SCSI Int. w/Zip Zoom	119.95
46890 Zip Drive ATAPI Insider	99.95
44705 Zip Plus	169.95
183933 Zip Disk 10-Pack (Gray)	99.95
49269 Jaz Drive 1GB SCSI Ext. (Refurbished)	139.95
23616 Jaz 1GB SCSI Ext.	299.95
182878 Jaz 2GB SCSI Ext.	349.95
24282 Jaz 1GB Disk Single	99.95
32556 Jaz 1GB Disk 3-Pack	269.95
47079 Jaz 2GB Disk 3-Pack	299.95

Kodak

181648 CDR Media-30	\$69.95
---------------------	---------

Memorex

52496 CDR 74min 10-Pack w/320 Mail-in Rebate	\$27.95
39620 CDR 74min 100-Pack	149.95
48589 CD-RW Disc 5-Pack w/5 FREE CD-R Discs	49.95

Quantum

49843 DLT IV 35/70GB Tape Cartridge	\$86.95
58561 6.1GB Fireball II Ultra DMA HD	159
50869 4.3GB Fireball SE Ultra SCSI HD	289
50868 6.4GB Fireball SE Ultra SCSI HD	369
50867 8.4GB Fireball SE Ultra SCSI HD	499

Seagate

49529 2.1GB Medialist IDE HD	\$115
46199 3.2GB Medialist IDE HD	119
51475 4.3GB Medialist Ultra ATA HD	139
51476 6.5GB Medialist Ultra ATA HD	169
50294 8GB TapeStor Int. SCSI Travan Tape Drive	229
54435 9.1GB Medialist Pro Ultra ATA HD	269
54431 9.1GB Barracuda 9LP SCSI	629
55963 9.1GB Cheetah Ultra2 LVD HD	789
56519 LUX200 Barracuda Ultra Wide SCSI HD	1119
56824 4.5GB Cheetah Ultra2/LVD HD	1399

Smart and Friendly

53467 4x12 CD Speedwriter SCSI Int.	\$399
53408 4x12 CD Speedwriter SCSI Ext.	499
90181 4x26 CD-RW 426 SCSI Ext.	599

SyQuest

47250 SparQ 1GB Ext. Parallel Drive	\$199
47251 SparQ 1GB Int. EIDE Drive	199
182638 SparQ Cartridge Bonus Pack	179.95
48840 Sylet 1.5GB Ext-SCSI Drive	299
48846 Sylet 1.5GB Cartridge 3-Pack	139.95

Western Digital

42537 5.1GB Caviar Retail-Packaged HD	149.95*
45819 6.4GB Caviar Retail-Packaged HD	169.95*

55997 8.4GB Caviar Retail-Packaged HD	199.95*
181327 10.1GB Caviar Retail-Packaged HD	249.95*

Yamaha

50487 2x4x6 CDRW4260 Ext. SCSI	\$549
--------------------------------	-------

UPS & POWER

American Power Conversion

56170 Back-UPS Pro 650 (410W)	\$279.95
56187 Back-UPS 500 (330W)	149.95
21929 Back-UPS Pro 1000 (670W)	389.95
56184 Back-UPS 300 (180W)	99.95
56185 Back-UPS Office 280	84.95
21928 Back-UPS Pro 1400 (950 Watts)	549.95
56189 Back-UPS Pro 420 (260W)	229.95
31466 Smart-UPS 700 Net (450W)	369.95
31469 Smart-UPS 1400 NET (950W)	639.95
31470 Smart-UPS 2200 NET (1600W)/PowerChute+	999.95

Opti-ups

181381 280ES (280W)	\$99
181383 420ES (420W)	149

Tripp Lite

21833 Super Surge Suppressor	\$17.95
6786 Isobar 4 Ultra	44.95
8630 Isobar 6 Ultra	54.95
13147 Isobar 6 Ultra	64.95
100894 Internet Office 400	89.95
45094 OmniSmart 1050 PNP	359.95
21844 BC Pro 1400 UPS (940 Watts)	419.95
45091 SmartPro 1400 NET UPS	494.95

NETWORKING

3Com

182896 Fast Etherlink LX PCI 6-Pack	\$449.95
182899 56K/90 Modem PC Card and 10/100 PC Card	349.95
51638 SuperStack II Dual Speed Hub 500 12-Port	729.95
53751 SuperStack II Switch 3300 24-Port	2499

Asanté Technology

38297 10BaseT FriendlyNet 8-Port Hub	\$46.95
49858 FriendlyNet 8+2 Switch Plus	329.95

Axis Communications

48824 Axis 150 Ethernet Print Server	\$99.95*
55790 Axis 200+ Web Camera	849.95

Bay Networks

50962 151 10BT 24 PD4 Hub	\$649
---------------------------	-------

Belkin

37711 OmniView KVM 2-Port	\$189.95
32666 OmniView KVM 6-Port	279.95

Cisco

52027 Catalyst 1900 10BT 24 Port Switch	\$1849
---	--------

DLink

53371 Dual Speed 10/100BTX SOHO 4-Port Hub	\$89.95
53384 Dual Speed 10/100BTX 8-Port Hub	219.95
53365 Dual Speed 10/100BTX Stackable 8-Port Hub	349.95
53373 DFE-916X 10/100BTX 16-Port Hub	649.95

HP Networking

29562 Jet Direct EX Plus Print Server Ethernet LANs	\$329.95
---	----------

Intel

50621 Pro/100 Card Bus Mobile Adapter	\$279.95*
183647 Create & Share Camera w/Software & Bunny Doll	134.95

Linksys

46533 PRO/100+ PCI Adapter	79.95
----------------------------	-------

Linksys

89287 10/100BaseTX PCMCIA PC Card; 16-bit	\$74.95
60832 10/100BaseTX PCMCIA PC Card; 32-bit	79.95
59632 10/100BaseTX Etherfast 5-Port Hub	69.95
59650 10/100BaseTX 24-Port Auto-sensing Hub	429.95
59629 10/100BaseTX PCI Etherfast LAN Card	29.95
58280 10/100BaseTX 8-Port Auto-Sensing Hub	149.95

Netgear

35484 FA310TX 10/100BTX Fast Ethernet PCI Adapt.	\$28.95
47890 RT328 ISDN Router	289.95
63840 DS108 10/100BaseTX 8-Port Hub	219.95
53562 DS516 10/100BaseTX 16-Port Stackable Hub	599.95
48222 FS508 Fast Ethernet Switch 8-Port	619.95

Xircom

55424 RealPort 56K Modem & 10/100BTX Ext. Adapt.	\$319.99
--	----------

SOFTWARE

Adobe Systems

54674 Adobe Photoshop 5.0 Version Upgrade	\$189.95
54675 Adobe Photoshop 5.0	599.95
43823 Adobe Acrobat 3.0.1	189.95
32847 Adobe PageMaker 6.5 Version Upgrade	119.95
32845 Adobe PageMaker 6.5	549.95
55128 Adobe Premiere 5 Version Upgrade	189.95
55127 Adobe Premiere 5	589.95

18078 Adobe Illustrator 8 Upgrade	119.95
180180 Adobe Illustrator 8	389.95

AutoDesk

104099 AutoSketch 6	\$84.95
54478 View 2	179.95
183625 AutoCAD LT 98	389.95

Computer Associates

103229 ARCserve 6.6 Workgroup Ed. for Win NT	\$399.95
183234 Inoculante 4.5 Workgroup Ed. for WinNT	399.95
183257 ARCserve 6.6 Workgroup Ed. w/ProPack	449.95

Corel

57335 Corel PrintOffice	\$89.95
49873 Corel Photo-Paint 8 Upgrade	94.95
55722 WordPerfect Suite 8 w/Dragon Nat. Speak Upg.	94.95
53862 Corel Ventura 8 Upgrade	134.95
55721 WordPerfect Suite 8 w/Dragon Nat. Speaking	329.95
48615 CorelDRAW 8 Upgrade	239.95
48619 CorelDRAW 8	439.95

Dragon

180242 Dragon Naturally Speaking Preferred	\$189.95
--	----------

FileMaker

180346 NEW! FileMaker Pro 4.1	\$134.95*
54967 Home Page 3.0	89
54877 FileMaker Pro Developer Edition	479.95
54879 FileMaker Pro Server 3.0	899.95

IBM

58637 ViaVoice 98	\$139.95
-------------------	----------

Lotus

182354 NEW! Organizer 5.0	\$54.95*
45962 Notes 4.6 Desktop/Client	97.95
58809 SmartSuite Millennium Edition	399.95

Macromedia

51189 FreeHand 8 Upgrade	\$144.95
55638 Dreamweaver 1.2	294.95
55886 FireWorks	294.95
58890 Flash 3	294.95
58887 FreeHand Design in Motion Suite Upg.	294.95
51188 FreeHand 8	394.95
57904 Director Multimedia Studio 6.5 Upg.	489.95

McAfee

 Autodesk.

Canon

CANON COMPUTER SYSTEMS, INC.

**COMPUTER
ASSOCIATES**
Software superior by design

EPSON

FORELOGIC

GOLDMINE
Software Corporation

 **HEWLETT
PACKARD**

Inc.
MAGAZINE

intel


MICROGRAFX

Microsoft


NETSCAPE

Tektronix


VGA


WRQ

X

 **ZIFF-DAVIS**
a SOFTBANK
company

It's Chili Time MON!



Join us at the Micrografx Chili for Children Cook-Off & Concert at COMDEX/Fall '98

Bring your reggae spirit and appetite for fun to COMDEX/Fall to see what the IT industry's top names are cooking up. Armadillo races and the fabulous sounds of Ziggy Marley & The Melody Makers will spice up your night. All proceeds benefit the National Center for Missing & Exploited Children. Party for a good cause, MON!

Ziggy Marley & The Melody Makers
Tuesday, November 17, 1998
MGM Grand Conference Center, Las Vegas
6 -11 p.m.

Order early! Call 1-800-357-7255 or visit www.micrografx.com/chili98. Tickets also available in the lobby of the LVCC or Sands Expo during COMDEX/Fall '98. Cook-Off & Concert tickets are \$50.00 each. Concert-Only tickets (8:30pm admission) are \$25.00 each. Corporate sponsorships still available from \$3,500 - \$35,000. Call Kate Potts 972-994-6413.

NATIONAL
CENTER FOR
**MISSING &
EXPLOITED
CHILDREN**




MICROGRAFX

MAKING THE WORLD A SAFER PLACE THROUGH STATISTICS...

SPSS[®] 9.0

Real Stats. Real Easy.[™]

UNRIVALED
DATA
ACCESS

CONVERT
YOUR DATA INTO
DECISION-MAKING POWER.

I DID!

IN-DEPTH
STATISTICS &
MODELING

FIND
PATTERNS

MAKE
PREDICTIONS

SPSS HELPS YOU...

- PICK THE RIGHT TYPE OF ANALYSIS
- INTERPRET YOUR RESULTS

EASILY SEE DISTRIBUTION!
From your analysis like never before.

INTERACTIVE
GRAPHS

Report
OLAP

DICE! DICE! DRILL DOWN!
Get key views of your results at a glance.

www.spss.com

1 (800) 543-5833

SPSS[®]

SPSS is a registered trademark of SPSS Inc.
S9AD 1098PCM A5833

MicroWAREHOUSE[®]

computer products!

On in-stock items. Call by midnight Eastern.

CALL FOR A
FREE
FULL-COLOR
CATALOG!



3Com • Iomega • Epson • Microtek • NEC • APC • Olympus • USRobotics

COMPAQ Armada 7362DMT

- 233MHz Pentium[®] processor w/MMX • 32MB RAM (128MB max.) • 3.0GB HD
- 30K CD-ROM drive • 24.0Kbps modem • 12.1" SVGA TFT display

Only \$1499!
(ITEM # C7714)

EPSON

Only \$199.95!
Item # PR14064

NEW!

EPSON STYLUS COLOR 640

- 1440 x 720dpi
- Laser quality black text • 5ppm blk/3.5ppm color

NEW! Stylus Color 440; only \$149.95. Item # PR14068.

3COM ETHERLINK III PC CARDS

• 10BASE-T

ONLY \$129.95 ea.

ASK FOR ITEM # DEC2554.

3Com PC cards are available in 5 & 20 packs.

Single 10/100 card only \$149.95. Item # DEC2554.

Iomega[®] 100MB Zip[™] Drive

SCSI Internal Zip Drive Only

\$119.95
Item # DR8378

Internal ATAPI only \$99.95
Item # DR8318

External parallel port (shown):
only \$119.95. Item # DR8278.

*Manufacturer's suggested retail. While supplies last.

Iomega 2.0GB Jaz Drive

Internal only

\$399.95
Item # DR1070

External SCSI (shown):
only \$399.95. Ask for item # DR12300.

Iomega Buzz Multimedia Producer;
only \$199.95. Ask for item # EX8161.

All-in-Wonder Pro 8MB

As low as

\$279!
EX3105

• Video capture
• TV tuner
• TV output

PCI version; only \$279. Ask for item # EX9105.
AGP 2X version; only \$279. Ask for item # EX9106.

D-800L Digital Camera

Now only

\$899.95
was \$999.95

OLYMPUS

New Low Price!

- 1280 x 1024 resolution
- 3X zoom lens
- 4MB Smart Media card

HP ScanJet 5100CSE

Only

\$299.95
Item # DR8118

- 600dpi hardware super sampling, 1200dpi enhanced
- 36-bit color imaging
- Includes PrecisionScan with integrated OCR, Adobe PhotoDeluxe and scanning software

LAPTOPS IBM COMPAQ TOSHIBA

CP9078: IBM Thinkpad 380Z PII/233MHz, 4.0GB, 32MB, 24X, 13.3" TFT, Win 98	\$2469.00
CP9081: IBM Thinkpad 580Z PII/300MHz, 6.4GB, 64MB, 12.1" TFT, Win 98	\$3999.00
CP9088: IBM Thinkpad 600E PII/300MHz, 6.0GB, 64MB, DVD, 56K, 13.3" TFT, Win 98	\$4499.00
CP9102: IBM Thinkpad 770X PII/300MHz, 8.1GB, 64MB, DVD, 14.1" TFT, MT	\$5199.00
CP8941: Satellite 4000CDS PII/233MHz, 4.0GB, 32MB, 20X, 56K, 12.1" SVGA DSTN	\$1699.00
CP8940: Satellite 4000CDT PII/233MHz, 4.0GB, 32MB, 20X, 56K, 12.1" SVGA TFT	\$1999.00
CP9260: Satellite 4010CDS PII/266MHz, 4.0GB, 32MB, 20X, 56K, 12.1" SVGA DSTN	\$1999.00
CP9261: Satellite 4010CDT PII/266MHz, 4.0GB, 32MB, 20X, 56K, 12.1" SVGA TFT	\$2299.00
CP9181: Armada 1700 PII/233MHz, 3.2GB, 32MB, 24X, 56K, 12.1" SVGA CSTN	\$1999.00
CP8217: Armada 1700 PII/266MHz, 4.0GB, 32MB, 24X, 56K, 13.3" VGA CRT	\$2799.00

DESKTOPS IBM COMPAQ HEWLETT PACKARD

CP9107: Compaq Deskpro EN Celeron/300MHz, 32MB, 3.2GB, 32X, Win 95, DT	\$1179.00
CP9100: Compaq Deskpro EN Celeron/333MHz, 32MB, 6.4GB, 32X, NIC, Win 95, MT \$1399.00	
CP9110: Compaq Deskpro EN PII/400MHz, 32MB, 6.4GB, Win 95, DT	\$1499.00
CP7785: Compaq Deskpro EN PII/350MHz, 32MB, 6.4GB, NIC, Win NT, DT	\$1499.00
CP7751: Compaq Deskpro EN PII/450MHz, 64MB, 6.4GB, 32X, NIC, Win NT, MT	\$1949.00
CP7774: Compaq Deskpro EN PII/350MHz, 32MB, 6.4GB, 24X, NIC, Win NT, MT	\$1649.00
CP7751: Compaq Deskpro EN PII/400MHz, 64MB, 9.1GB ¹ , 24X, NIC, Win NT, MT	\$2399.00
CP9096: IBM PC300PL PII/450MHz, 64MB, 6.4GB, 32X, Win NT, MT	\$2199.00
CP9090: IBM PC300GL PII/350MHz, 32MB, 3.2GB, Win 98, DT	\$1229.00
CP9093: IBM PC300GL PII/450MHz, 64MB, 6.4GB, 32X, Win NT, DT	\$2059.00
CP8965: HP Brio 7133, Celeron/300MHz, 32MB, 2.1GB, 32X, MT, Win 98	\$999.00
CP9025: HP Brio 8534, Celeron/333MHz, 32MB, 4.3GB, 32X, MT, Win 98	\$1199.00
CP8969: HP Brio 8531, PII/350MHz, 32MB, 8.0GB, 32X, Win 98	\$1399.00

¹Includes Ultra-wide SCSI hard drive.

SCANNERS

IN7313: HP ScanJet 4100CSE NEW!	\$199.95
IN8118: HP ScanJet 5100CSE	\$299.95
IN7311: HP ScanJet 6200CSE NEW!	\$399.95
IN7312: HP ScanJet 6250CSE w/25 page Auto Document Feeder NEW!	\$499.95

PRINTERS

PR12977: HP LaserJet 4000se Printer 17ppm/1200dpi	\$1149.99
PR14129: HP DeskJet 712C 8ppm blk/3ppm color NEW!	\$249.95
PR13789: Lexmark Optra K 1220 12ppm/600dpi	\$729.95
PR13601: Okidata Okipage 10L 10ppm/600dpi	\$499.95

MONITORS

MT1544: A500 15", 13.8" viewable, 1280 x 1024 @ 60Hz	\$219.95
MT1546: A700 17", 15.6" viewable, 1280 x 1024 @ 65Hz	\$419.95
MT1451: Optquest 053 15", 13.8" viewable, 1280 x 1024 @ 60Hz	\$179.95
MT1580: Optquest V95, 19", 18" viewable, 1600 x 1200 @ 76Hz	\$529.95

MODEMS

DMD3947: US Robotics 56K Fax/modem - V.90 - Internal	\$127.99
DMD3441: US Robotics 56K Fax/modem - V.90 - External	\$147.99
DMD3443: US Robotics 56K WIN modem - V.90 \$30 REBATE	\$57.99*
DMD3598: 3Com Megahertz 56K cellular capable XJack - Mac & PC	\$209.99

*Price after mfr's \$30 mail-in rebate. Price before rebate is \$87.99. Offer expires 12/31/98.

STORAGE

DR8698: Western Digital Caviar 8.4GB EIDE Hard Drive	\$229.95
DR8124: Quantum Fireball SE 4.3GB Ultra DMA Hard Drive	\$159.95
DR8132: Quantum Viking 4.5GB SCSI Hard Drive-7, 200 RPM	\$299.95
DR8188: Seagate Barracuda 18.2GB Ultra SCSI Hard Drive	\$1199.95
DR8189: Seagate Barracuda 18.2GB Ultra Wide SCSI Hard Drive	\$1199.95

1-800-378-9159 ★ www.warehouse.com/pm

ORDER TOLL-FREE 24 HOURS A DAY, 7 DAYS A WEEK!

MicroWAREHOUSE[®]

EXPRESS DELIVERY
OVERNIGHT!



Choose UPS at www.pcma.com/UPSlink

(and on, and on, and on).



MicroSolutions
The portability leader.

Ph: 800-293-1214 (US and Canada) or 815-756-3411, Fax: 815-756-2928
Internet: www.mico-solutions.com

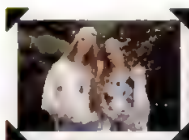
CDW - 800 736 4239 • CompUSA Direct - 800 514.4727 • ComputAbility - 800.741.7735 • Global Computer Supplies - 800.845 6225 • Micro Center - 800 743.7537
Micro Warehouse - 800 367 7080 • Midwest Micro - 800 413 9856 • PC Connection, Inc. - 800 800 5555 • PC Zone - 800 258 2088

Come see us at Fall COMDEX Booth L5562 and win groovy prizes!
Choose 027 at www.pcmag.com/infolink



You'll be getting good vibrations as you create your own CDs with the backpack cd-rewriter by Micro Solutions, the leader in parallel port CD-ROM. With one cool, inexpensive

package, you can be your own author and publisher! Plus, you get unlimited rewritable storage—up to 650MB of data or 74 minutes of audio per disc. The backpack cd-rewriter accepts both CD-R and CD-RW media, so you can write once or write and rewrite. It also comes bundled with software that lets you store data, archive photographs and record music. What a great way to preserve the sounds from those old LPs you've got lying around. (You don't still own a turntable, do you?)



In case you haven't heard, the backpack family of products includes diskette drives, hard drives and cd-rom drives. The backpack cd-rewriter, like all the rest, is compatible with notebook and desktop PCs. It also comes with smart printer-pass-through technology. You're just one cable connection away from a world of music and data. Outsight, man!



2x and 4x write models available. 2x model requires a Pentium and EPP port.
4x model requires a PII 300 and EPP port.

Almost nothing influences buyers in the computer market as much as a great product review, particularly one in PC Magazine. That's because computer product buyers rely on these reviews to help them make informed purchase decisions. They know that our labs, writers and editors can be trusted to be thorough, fair and impartial in their testing and reporting. For a computer product marketer a great review is almost priceless.

[illegible]

ing tool for your product and an important image builder for your company. An objective, third party product evaluation will be read, and trusted, by far more people than any regular product literature, direct mail, press release or sales letter. Think of all the ways you can take advantage of reprints:

- ▶ Use them in sales proposals
- ▶ Hand them out at trade shows
- ▶ Send them to your mailing list
- ▶ Provide them to distributors
- ▶ Add them to a press release or a mailing to your stockholders.

And, if you customize your reprints — with a special cover, highlighting, an ad, sales office listings, etc. — the value increases even more.

Get the most value from your PC Magazine review. Call Ziff-Bavis Reprints today at **800-825-4237**.



ENHANCE YOUR PRODUCTIVITY, NOT YOUR DEBT.



Our selection of refurbished
systems changes daily,
and quantities are limited.

CALL NOW TO ORDER.

DELL OPTIPLEX GX1 400 DESKTOP PENTIUM II PROCESSOR AT 400MHz

64MB Memory • 6.4GB Hard Drive • 32X Max[†]
Variable CD-ROM • 16-bit Sound • 4MB AGP Video
• 56Kbps Modem[™] • 10/100Mbps Ethernet

\$1517 Monitor Sold Separately

Upgrade: 128MB Memory for \$150.

DELL PRECISION™ 410 WORKSTATION PENTIUM II PROCESSOR AT 400MHz (DUAL PROCESSOR CAPABLE)

128MB Memory • 4GB SCSI Hard Drive • 32X Max[†]
Variable SCSI CD-ROM • 16-bit Sound • 8MB AGP
Video • 10/100Mbps Ethernet

\$1975 Monitor Sold Separately

Upgrade: 256MB Memory for \$300.

DELL OPTIPLEX® GX1 333 DESKTOP PENTIUM® II PROCESSOR AT 333MHz

64MB Memory • 4.3GB Hard Drive • 32X Max[†]
Variable CD-ROM • 16-bit Sound • 4MB AGP Video
• 56Kbps Modem[™] • 10/100Mbps Ethernet

\$1313 Monitor Sold Separately

Upgrade: 6.4GB Hard Drive for \$50.

DELL LATITUDE® CPI D26XT NOTEBOOK PENTIUM II PROCESSOR AT 266MHz

64MB Memory • 4GB Hard Drive • 24X Max^{††} Variable
CD-ROM • 16-bit Sound • 13.3" XGA Active Matrix
Display • Lithium Ion Battery • 56Kbps Modem[™]

\$2451 Monitor Sold Separately

Upgrade: 128MB Memory for \$200.

DELL POWEREDGE® 2300 SERVER PENTIUM II PROCESSOR AT 400MHz (DUAL PROCESSOR CAPABLE)

128MB Memory • 9.1GB SCSI Hard Drives • 32X Max[†]
Variable SCSI CD-ROM • 10/100Mbps Ethernet

\$2482 Monitor Sold Separately

Upgrade: 256MB Memory for \$300.

Welcome to Dell Refurbished,
where you can buy current computer
technology for less. We offer quality
refurbished Dell desktops, notebooks,
workstations and servers.

DELL REFURBISHED SYSTEMS INCLUDE:

- Original Dell quality specifications
- Three-year same-as-new limited warranty[†]
- Free 24-hours-a-day, seven days-a-week technical hardware support
- Microsoft® Windows® 95 and Home Essentials 98 (desktops and notebooks)
- Microsoft Windows NT® 4.0 (workstations)

ACCESSORIES (with system purchase)

harman/kardon HK-195 Speakers	\$35
APC SurgeStation Pro 8T2 Surge Suppressor	\$39
APC Back-UPS Pro 650 Power Supply	\$289
Nylon Notebook Carrying Case	\$49
Dell Latitude Secondary Lithium Ion Battery	\$129
3Com® 10/100Mbps CardBus Ethernet Card	\$169
Dell Latitude C/Port Advanced Port Replicator with Monitor Stand	\$349
Iomega 100MB External Zip Drive	\$149
Hewlett Packard DeskJet® 722C Inkjet Printer	\$299
Dell 1000HS 17" (15.9" viewable) Monitor	\$399

CALL NOW. SUPPLIES LIMITED
1-888-452-3106

- Mon-Fri 7am-9pm CDT
- Sat & Sun 10am-6pm CDT

Keycode 04931



All systems refurbished. Available configurations may vary. [†]For a copy of limited warranties, write to Dell Refurbished, 1 Dell Way - Box 65, Round Rock, TX 78682. Attn: Warranties. All sales FOB Austin. Supplies limited to stock on hand. No rain checks. Prices and specifications subject to change without notice and valid in the U.S.A. only. ^{††}32X Max/14X Min. ^{†††}24X Max/10X Min. ^{††††}Download speeds limited to 53Kbps. Upload speeds are less (in the 30Kbps range) and vary by modem manufacturer. Speeds also vary depending on line conditions. Analog phone line and compatible server equipment required. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. DeskJet is a registered trademark of Hewlett Packard Corporation. 3Com is a registered trademark of 3Com Corporation. Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation. Dell disclaims proprietary interest in the marks and names of others. Other trademarks and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. ©1998 Dell Computer Corporation. All rights reserved. Printed in the U.S.A. Reproduction in any manner whatsoever without the written permission of Dell Computer Corporation is strictly forbidden. Dell cannot be responsible for errors in typography or photography.

DELL
REFURBISHED

www.dell.com/outlet

PC Mail

The Mail With It All...For Less!

We Will Beat

We will beat any price on any computer, from any authorized catalog reseller. We want your business.



TOSHIBA Notebook Computers

Satellite 4000CDs

- 233MHz Pentium II processor w/MMX* technology
- 64MB RAM
- 4.1GB HD
- 24X CD-ROM
- 12.1" Dual Scan
- 56Kbps modem

Now only
\$1,649!
#34755

Affordable
Multimedia!

Order#	Model	Pentium® processor*	RAM	HD	CD	Display	Modem	Price
#30900	4900CD	PII233MMX*	32	4GB	20X	13.1" TFT	56K	\$2,349
#30902	4900CD	PII233MMX*	32	4GB	20X	13.3" TFT	56K	\$2,449

Tecra Series

#34763	8000	PII233MMX*	32	4GB	24X	12.1" TFT	56K	\$2,749
#34767	9000T	PII266MMX*	64	6GB	24X	13.3" TFT	56K	\$3,449
#30978	780CDM	PII266MMX*	64	5.1GB	20X	13.3" TFT	56K	\$3,099
#30976	780DVD	PII233MMX*	64	5.1GB DVD	13.3" TFT	56K	56K	\$3,099

Portege 7000 Series

#34810	7000CT	PII266MMX*	32	4.3GB	—	12.1" TFT	56K	\$2,929
--------	--------	------------	----	-------	---	-----------	-----	---------

Satellite Series

#34758	4000CDs	PII233MMX*	64	4.1GB	24X	12.1" DSTN	56K	\$1,649
#34758	4000CDT	PII233MMX*	64	4.1GB	24X	12.1" TFT	56K	\$1,749

Pentium® processor with MMX technology. *Windows 95

HITACHI



VisionBook Plus

- 266MHz Pentium® processor w/MMX* technology
- 32MB RAM
- 3.2GB HD
- 12.1" TFT Display
- 56K Modem
- Windows 95

AS LOW AS
\$2,199!
#32710

#32710	Pro 6390	266MMX	32	3.2GB	24X	12.1" TFT	56K	\$2,199
#31862	Pro 7630	PII233*	32	3.2GB	24X	12.1" TFT	56K	\$2,399
#31866	Pro 7755	PII266*	64	4.0GB	24X	13.3" TFT	56K	\$3,199

Pentium® processor with MMX technology.

IBM Notebook Computers

ThinkPad 380XD

- 233MHz Pentium® processor w/MMX* technology
- 32MB
- 4.6GB HD
- 24X CD-ROM
- 12.1" TFT display

only
\$2,259!
#28627

Order#	Model	Pentium® processor*	RAM	HD	CD	Display	Modem	Price
#35175	TP380Z	PII233MMX*	32	4.6GB	24X	12.1" HPA	—	\$2,479
#35180	TP380Z	PII300MMX*	32	4.0GB	24X	12.1" HPA	—	\$3,049
#35181	TP380Z	PII300MMX*	32	4.0GB	24X	12.1" HPA	—	\$3,139

ThinkPad 560

#11247	TP560X	PII233MMX*	32	4GB	—	12.1" TFT	—	\$2,189
#35329	TP560X	PII233MMX*	32	4GB	—	12.1" TFT	56K	\$2,609
#35338	TP560X	PII300MMX*	64	6.4GB	—	12.1" TFT	56K	\$3,619
#35343	TP560X	PII300MMX*	64	6.4GB	—	12.1" TFT	56K	\$3,709

IBM ThinkPad 6100

#30322	TP610X	PII266MMX*	32	2GB	10-24X	13.3" TFT	56K	\$3,229
#30323	TP610X	PII266MMX*	32	4.0GB	10-24X	13.3" TFT	56K	\$3,799
#33832	TP610X	PII266MMX*	32	3.2GB	24X	12.1" TFT	56K	\$3,049
#35167	TP610X	PII266MMX*	64	5.1GB	24X	13.3" TFT	56K	\$4,139
#35163	TP610X	PII266MMX*	64	6.0GB	DVD	13.3" TFT	56K	\$4,399

ThinkPad 770

#30325	TP770E	PII266MMX*	32	5.1GB	—	14.1" TFT	33.6K	\$3,759
#30327	TP770ED	PII266MMX*	64	8.1GB	DVD	14.1" TFT	56K	\$5,079

*Windows 95 *TWindows NT

LENOVO

LifeBook C340



- 233MHz Pentium® processor w/MMX* technology
- 32MB RAM
- 3.2GB hard drive
- 20X CD-ROM drive
- 12.1" HPA
- 56K fax/data modem
- Win 95

only
\$1,499!
#35828

#35828	C340	PII233MMX*	32	3.2GB	20X	12.1" HPA	56K W95	\$1,499
#35833	C350	PII266MMX*	32	4.0GB	20X	13.0" HPA	56K W95	\$1,799
#36034	E330	PII233MMX*	32	3.2GB	24X	12.1" TFT	56K W95	\$1,999
#36036	E335	PII233MMX*	32	3.2GB	24X	13.3" TFT	56K W95	\$2,399
#36038	E340	PII266MMX*	32	4.0GB	24X	13.3" TFT	56K W95	\$2,799
#36044	E350	PII300MMX*	32	5.0GB	24X	13.3" TFT	56K W95	\$3,299

Pentium® processor with MMX technology.

COMPAQ

Desktops for Business and Home

Deskpro EP

- 300MHz Celeron® processor w/MMX* technology
- 32MB RAM
- 4.3GB hard drive
- Towerable design

only
\$929!
#36293



Order#	Processor	RAM	HD	CD	Form Factor	System	Price
#36311	Celeron 333MHz*	32	4.3GB	—	TD	Win95	\$959
#36312	Celeron 333MHz*	64	4.6GB	32X	TD	Win95	\$1,269
#36296	PII 350MHz MMX*	64	4.3GB	—	TD	Win95	\$1,309
#36314	PII 400MHz MMX*	64	10GB	32X	TD	Win95	\$1,789
#36315	PII 450MHz MMX*	64	10GB	32X	TD	Win95	\$1,919
#31808	PII 300MHz MMX*	32	3.2GB	24X	TD	Win95	\$1,149

Home Desktops EM Series

Order#	Pentium® Processor	RAM	HD	CD	Form Factor	System	Price
#36285	Celeron 300MHz*	32	3.2GB	—	DT	Win95	\$1,119
#36286	Celeron 300MHz*	32	3.2GB	32X	MT	Win95	\$1,249
#36288	Celeron 333MHz*	32	3.2GB	—	DT	Win95	\$1,169
#36289	Celeron 333MHz*	32	6.4GB	32X	MT	Win95	\$1,389
#36282	PII 400MHz MMX*	32	6.4GB	—	DT	Win95	\$1,569

Pentium® II processor with MMX technology
Celeron® processor w/MMX* technology

only
\$897!
#32880

HP Color Palmtop 660LX w/56K Modem

- 32MB RAM
- Windows CE 2.0
- 10MB ROM
- 56K Modem



300MHz Media GX II Processor w/MMX* Technology!

COMPAQ

Presario 2266

- 64MB RAM
- 32X CD
- 4GB hard drive
- 56Kbps modem

\$699*
#36811

\$100 Mail-In Rebate

Monitor sold separately.



Order#	Processor	RAM	HD	CD	Modem	Price
#34876	Celeron 333MHz MMX	16MB	8GB	32X	56K	\$899
#35916	300MHz AMD-K6	128MB	9GB	32X	56K	\$1,109
#35923	PII 350MHz	128MB	10GB	32X	56K	\$1,409
#34875	PII 450MHz	128MB	12GB	DVD	56K	\$2,109

#35923 includes Verbatim Zip drive
*Price reflects \$100 mail-in rebate when you purchase an eligible Presario and sign up for a 50-hour free trial of Compaq easy Internet Access.
*MSRP shown

UMAX 300MHz PII Processor w/MMX Technology

- 64MB RAM
- 34X CD ROM
- 6.4GB Hard Drive
- 56K Modem
- Windows 95

only
\$999!
#35218



#35218	PII300MMX	64	6.4GB	34X	8MB	56K	W95	\$999
#35854	PII350MMX	64	8.4GB	32X	8MB	56K	W95	\$1,499
#35855	PII400MMX	64	8.4GB	36X	8MB	56K	W95	\$1,599

COMPAQ Notebook Computers

Armada 1585

- 150MHz Pentium processor w/MMX Technology
- 16MB RAM
- 2.1GB HD
- 12X CD
- 12.1" TFT
- 33.6Kbps Modem

Only **\$1,199!** #30811
Factory refurbished
Compaq rebates
and savings apply
See us for details on this offer



Order#	Model	Pentium® processor*	RAM	HD	CD	Display	Modem	Price
#33274	1570MT	233MHz MMX*	32	3.2GB	20X	12.1" DS	56K	\$1,629
#26786	1592MT	233MHz MMX*	32	3.1GB	20X	12.1" TFT	56K	\$1,979

Armada 1700 Series

#33230	1700	PII 233MHz MMX*	32	4.0GB	24X	12.1" TFT	56K	\$2,479
#33235	1700	PII 266MHz MMX*	32	4.0GB	24X	13.3" TFT	56K	\$2,979
#35361	1700	PII 300MHz MMX*	32	5.0GB	24X	14.1" TFT	56K	\$3,789

New Armada 7800 Series

#31072	7800	PII 266MHz MMX*	64	5.0GB	24X	13.3" TFT	33.6K	\$4,299
#31073	7800	PII 266MHz MMX*	64	5.0GB	24X	13.3" TFT	—	\$4,699

Armada 3500 Series

#35380	3500	PII 266MHz MMX*	32	4.1GB	—	12.1" TFT	—	\$3,229
#35381	3500	PII 300MHz MMX*	64	6.4GB	—	13.3" TFT	—	\$4,199

Armada 6500 Series

#35463	6500	PII 300MHz MMX*	64	8.4GB	24X	14.1" TFT	56K	\$4,899
#35465	6500	PII 300MHz MMX*	64	8.4GB	24X	14.1" TFT	56K	\$4,899

*Integrated 56K w/ 10/100 Ethernet *TWindows NT

COMPAQ

Presario 1220

- 200MHz Media GX enhanced processor w/MMX* technology
- 16MB RAM
- 2.1GB HD
- 56Kbps Modem
- 20X CD-ROM
- 12.1" HPA Display
- Factory refurbished

only
\$1,199!
#36505

Order#	Model	Pentium® processor*	RAM	HD	CD	Display	Modem	Price
#36011	1235	266MHz AMD-K6	32	4.0GB	24X	12.1" HPA	56K	\$1,799
#36007	1240	266MHz AMD-K6	64	4.0GB	24X	12.1" TFT	56K	\$2,099
#32556	1650	PII 266MHz	64	4.0GB	24X	12.1" TFT	56K	\$2,599
#32563	1655	PII 266MHz	64	4.0GB	24X	13.3" TFT	56K	\$2,799
#36014	1810	PII 300MHz	64	6.4GB	DVD-2	13.3" TFT	56K	\$3,599

Memory Prices Slashed!

- 16MB only **\$19.99!** FREE UP! #5416
Screensaver with any memory purchase!
- 32MB only **\$39.99!** #5417
See us for details on this offer.
Offer is good through 12/31/95.

IBM

Networking Solutions Designed for Your Business

IBM PC 300GL

- 350-450MHz Pentium II processor w/MMX* technology or 300MHz Celeron processor
- 32 to 64MB RAM
- 3.2 to 6.4GB hard drive
- 512KB L2 cache (128KB on Celeron models)



Monitor sold separately.

Order#	Model	Processor	RAM	HD	CD	Price
#36508	627512U	Celeron 300	32MB	3.2GB	—	\$999
#36601	627522U	Celeron 300	32MB	3.2GB	—	\$1,099
#36604	627525U	Celeron 300	32MB	3.2GB	32X	\$1,199
#36607	628513U	Celeron 300	32MB	3.2GB	—	\$1,229
#36590	627557U	PII350	32MB	3.2GB	—	\$1,339
#36612	627575U	PII350	64MB	6.4GB	32X	\$2,039
#36613	627574U	PII450	64MB	6.4GB	—	\$1,929
#33327	627555U	PII350	32MB	3.2GB	—	\$1,299
#33328	627556U	PII350	64MB	3.2GB	—	\$1,349
#33329	627566U	PII400	64MB	6.4GB	—	\$1,899

Mini-tower

Any Price!

Call us... and we'll give you the best price anywhere!

Introducing our NEW Web Site!
Faster, Easier Online Shopping Now!
savebig.pcmall.com

Color Printers

NEW! HP DeskJet 712C Printer

Built-in Photo Quality Color
• HP's PhotoREt II Technology
• 6ppm black, 3ppm color

only **\$249⁹⁹!** #36106

#36109	NEW HP DeskJet 687C Printer PhotoREt II, 5ppm black, 17 ppm color	\$179⁹⁹
#47696	HP DeskJet 340 Portable Printer up to 3ppm, 4851 Color Kit	\$269⁹⁹
#14434	HP DeskJet 722C Printer up to 8ppm black, 4ppm color	\$299⁹⁹
#14435	HP DeskJet 890Cse HP PhotoREt II, 3ppm black, 5ppm color	\$399⁹⁹
#42381	HP DeskJet 1120Cse Printer prints 4 x 6" up to 13" x 19" w/Hi	\$499⁹⁹
#42430	HP 2000Cse Professionals Series color printer, individual ink cartridges	\$799⁹⁹
#14717	HP OfficeJet 600 print, copy and scan in color, plain-paper fax	\$499⁹⁹

Hot New Printers!

#33729	Stylus Color 1440 x 720dpi, 6ppm black, 4ppm color, refurbished	\$149⁹⁹
#34763	NEW Stylus Color 640 Printer 1440 x 720dpi, 3.5ppm black, 3.5ppm color	\$199⁹⁹
#90225	Stylus Color 800 Printer 1440 x 720dpi, 8ppm black, 7ppm color	\$249⁹⁹
#34786	NEW Stylus Color 740 Printer USB, serial & parallel interface	\$279⁹⁹
#38973	Stylus Photo 700 Printer 1440 x 720dpi, 6-color printing	\$249⁹⁹

Laser Printers

HP LaserJet 5 Printer Blowout!
• 1600dpi resolution and microfine toner
• Up to 12ppm print speed
• 4MB standard, 66MB maximum
• Optional PostScript L2, Network card, paper tray and duplex accessories (call!)

While supplies last!

\$798⁹⁹
#79846

#95513	HP LaserJet 6Lse Printer 600dpi, up to 6ppm	\$399⁹⁹
#28438	HP LaserJet 3100se All-in-one Laser Printer/Fax/Copier/Scanner	\$699⁹⁹
#34579	HP LaserJet 6Pse 600dpi, up to 8ppm, w/FREE Companion se	\$799⁹⁹
#22660	HP LaserJet 4000se 1200dpi, 17ppm 4MB, 100MB max	\$1,149⁹⁹
#32161	HP LaserJet 4000N 12MB, Ethernet network-ready	\$1,438⁹⁹
#28432	HP LaserJet 5000 11" x 17", 1200dpi, 16ppm, 4MB, 1000MB max	\$1,449⁹⁹
#31315	HP LaserJet 8000 1200dpi, 24ppm 16MB, 192MB max	\$2,349⁹⁹

Hard Drive Blowout!

Quantum	Seagate	Seagate	Seagate
2.5GB UDMA	3.2GB UDMA	4.3GB UDMA	6.5GB UDMA
as low as \$109⁹⁹	as low as \$129⁹⁹	as low as \$139⁹⁹	as low as \$169⁹⁹
#335080	#340415	#34662	#32469

CD-ROM/CD-RW/DVD-ROM/RAM Drives

16X Internal EIDE CD-ROM Drive only **\$29⁹⁹!** #30533

New! HP CD-Writer 8110i Internal!

only **\$399⁹⁹!** #33823

• 4X 24X CD-R • 2X 8X CD-RW
• Includes HP Disaster Recovery
• Internal EIDE (ATAPI)

#31739	Memorex CD-RW Drive 2X/4X/2X Internal EIDE after 130 rebate	\$299⁹⁹
#31656	Philips 3610 CD-RW 2X/6X Internal EIDE NEW Low Price	\$299⁹⁹

PC-DVD ENCORE DVD-ROM 2X/20X KIT

only **\$199⁹⁹!** #24209

• 2X DVD-ROM, 20X CD-ROM speeds
• Includes development for MP3/2 + Audio Digital
• Support for Windows and DVD-ROM formats

PC Card and Desktop Modems

Netelligent 56K Internal Modem
• 1.5A not required, K56flex technology
• V.90 upgradable

COMPAQ only **\$39⁹⁹** #36016

Netelligent 56K PC Card Modem
• 1.5A not required, K56flex technology
• Flash upgradable to V.90

COMPAQ only **\$59⁹⁹** #36029

56K External Fax Modem
• X2 Technology
• V.90 upgradable

only **\$56⁹⁹!** #37230

#95482 Accura 33.6 External Modem, full duplex speakerphone **\$29⁹⁹**

FREE maxell
Maxell 20-Pack Color Disks w/any purchase
PC-formatted disk from \$20001 to your order. Check! You'll receive a multi- rebate coupon for \$8 with your order. Your first order. \$8. Limit: one pack per order. Rebate coupon must be received by 12/31/98. While supplies last.

Monitor Blowout
17" Ultra + Color Monitor only **\$199⁹⁹** #33131
• 15.8" viewable image
• 1280 x 1024 maximum resolution
• .28mm dot pitch
• Factory refurbished
When you purchase any computer from PC Mall. While supplies last.

#37086	Opbquest Q41 14/13.2 V1, 1024 x 768, 28mm, refurbished	\$89⁹⁹
#30626	Samtron 7E 17" monitor 15.7 V1 1280 x 1024, 28mm, 2yr warr	\$229⁹⁹
#22949	CPD-100ES 15" 14" 1280 x 1024 0.25mm	\$229⁹⁹
#24681	CPD-200ES 17" 16" 1280 x 1024 0.25mm	\$399⁹⁹
#24863	CPD-400PS 19" 18" 1600 x 1200 0.25mm	\$599⁹⁹
#24870	GDM-500PS 21" 20" 1600 x 1200 0.25mm	\$1,299⁹⁹

Removable Drives

Imega Zip 100MB Drive	only \$79⁹⁹! #98525
Imega ZipPlus Drive	only \$109⁹⁹! #36821

Imega 100MB Zip Drives	
#70053	Zip 100MB external parallel port New Low Price \$119⁹⁹
#69404	Zip 100MB external SCSI \$119⁹⁹
#14647	ZipPlus 100MB external drive SCSI Parallel New Low Price \$169⁹⁹
Imega Jaz Drives	
#24981	Jaz 1GB internal SCSI drive factory refurbished \$199⁹⁹
#15813	Jaz 1GB external SCSI drive, factory refurbished \$199⁹⁹
#15423	Jaz 2GB internal w/2GB Cartridge \$399⁹⁹
#15424	Jaz 2GB External w/2GB Cartridge \$399⁹⁹

SQUEST SparQ 1.0GB Drive	
#23899	SparQ 1.0GB External Drive, Parallel Port \$199⁹⁹

1000's of Software Titles Available!

PhotoDraw 2000 Combines photo editing and illustration with built-in design expertise.	Myth II Soulblighter The long-anticipated sequel to the award winning Myth!
only \$97⁹⁹! #33662 *Price reflects \$40 mfr. max. rebate	only \$46⁹⁹! #32620 Win 95/98 NT CD
#98166 Office 97 Pro, upgd comp upgd, Win 95/NT	#36660 Norton SystemWorks, Price after \$10 upgd./competitive upgd \$59⁹⁹

Scanners

ScanMaker X6EL with FULL Photoshop 4.0 • 16-bit • 15mm slide adapter • 600 X 1200dpi • Up to 8.5" X 14"	only \$399⁹⁹ #35186
FREE upgrade to Photoshop 5.0 from Adobe. Shipping and handling applies.	
#32157 Umax 610P Scanner 30 bit, 300 x 600dpi, parallel. Price reflects \$30 rebate	\$99⁹⁹
#29046 Umax 1220P - 35 bit, 600 x 1200dpi, optical. Price reflects \$30 rebate	\$99⁹⁹
#94312 Umax 1200S 30-bit, up to 8.5" x 14", 600 x 1200dpi. Price reflects \$30 rebate	\$199⁹⁹

UMAX The Magic of Color

#35571	HP ScanJet 4100Cse Scanner 36-bit Color, 600 x 600dpi, USB	\$199⁹⁹
#25471	HP ScanJet 5100Cse Scanner 36-bit Color Image Processor	\$299⁹⁹
#34857	NEW HP ScanJet 6200Cse Professional Scanner SCSI and USB	\$399⁹⁹
#34856	NEW HP ScanJet 6500Cse Professional Scanner with ADF	\$499⁹⁹

Digital Cameras

Sony Mavica FD81 Floppy Disk Camera XGA resolution 1024 x 768 Records on 3.5" floppy media		
\$799⁹⁹! #35603		
#34049	NEW Toshiba PDR-M1 1.5 Million Pixel Digital Camera, 1280 x 1024	\$699⁹⁹
#35889	NEW Nikon CoolPix 900s 1280 x 960 3MB 3X zoom, Nikon lens	\$749⁹⁹
#15454	Olympus D-800L 1280 x 1024, 4MB, 3X Zoom	\$899⁹⁹
#32425	Kodak DC260—True MegaPixel! 1536 x 1024, 8MB, 3X zoom	\$999⁹⁹

BUY FROM THE BEST!

- Fastest Overnight Delivery. Order Until 10pm—Get It Tomorrow By 10:30am! FedEx
- Over 45,000 Products!
- 1.8 Billion in Available Inventory!
- Open Accounts and Leasing!
- Custom Configuration!
- Volume Discounts!

Call Us At **1-888-901-6255**

Use Source Code #ZPCM8C1

Order Any Time! Open 24 Hours.

Or Visit Us Online @ **savebig.pcmall.com**

And Get...

- The Most Up-to-Date Pricing and Deals!
- The Newest Products!
- Unadvertised Specials!
- The Latest Product Availability!

Before You Buy—Call Us Toll Free or Visit Us Online!

Call Today to Get Your **FREE** PC Mall Catalog

No Credit Card Surcharges
VISA MasterCard American Express Discover

We accept Visa, MasterCard, American Express and Discover! Open Account. A. MaximizeNet is not a government agency, school, and business with instant approval. We are not responsible for any typographical, photographic or technical errors. NOTE: Products and packaging depicted may differ from stock available at time of shipment. We reserve the right to substitute equivalent items.

CDW: a one-stop resource for everything you need.

Desktops

COMPAQ

Deskpro EP Series

300 Celeron 32MB 4.3GB.....	909.57
333 Celeron 32MB 4.3GB.....	965.35
333 Celeron 64MB 6.4GB 32X.....	1266.63
350/PII 64MB 4.3GB.....	1315.14
350/PII 64MB 10GB 32X.....	1638.56
400/PII 64MB 10GB 32X.....	1779.62
450/PII 64MB 10GB 32X.....	1898.56

Deskpro EP Series

300/PII 32MB 4.3GB 24X.....	1339.43
350/PII 64MB 6.4GB 24X.....	1559.83
400/PII 64MB 6.4GB 24X.....	1696.81

Small Business Solutions

300/PII 32MB 4.3GB 24X.....	1339.43
350/PII 64MB 6.4GB 24X.....	1559.83
400/PII 64MB 6.4GB 24X.....	1696.81

Deskpro EN Series desktops

300 Celeron 32MB 3.2GB.....	1119.10
300 Celeron 32MB 3.2GB 10/100.....	1175.53
333 Celeron 32MB 3.2GB 10/100.....	1429.98
333 Celeron 32MB 3.2GB.....	1158.83
333/PII 32MB 4.3GB 10/100.....	1936.17
350/PII 32MB 6.4GB 24X.....	1574.47
350/PII 64MB 10GB 10/100.....	1769.87
400/PII 32MB 6.4GB.....	1579.23
400/PII 64MB 6.4GB 24X 10/100.....	1889.62
400/PII 64MB 4.3GB 24X 10/100.....	2229.79
450/PII 64MB 10GB 10/100.....	2138.19

Deskpro EN Series mini-towers

300 Celeron 32MB 3.2GB 32X.....	1249.46
333 Celeron 32MB 6.4GB 32X.....	1395.98

333 Celeron 32MB 6.4GB 32X 10/100.....	1479.22
333/PII 32MB 6.4GB 24X 10/100.....	1559.83
350/PII 32MB 6.4GB 24X 10/100.....	1699.13
350/PII 64MB 4.3GB 24X 10/100.....	2085.11
400/PII 64MB 9.1GB 24X 10/100.....	2484.04
450/PII 64MB 6.4GB 32X 10/100.....	2049.23
450/PII 64MB 9.1GB 32X 10/100.....	2595.74

Presario PCs

333 Celeron 96MB 8GB 32X.....	1299.00
450/PII 128MB DVD.....	2296.00

HP Brio Series mini-towers

300 Celeron 32MB 2.1GB 32X.....	999.62
333 Celeron 32MB 4.3GB 32X.....	997.75
333 Celeron 64MB 8GB 32X.....	1359.29
333 Celeron 32MB 4.3GB 32X.....	1264.51
333/PII 32MB 4.3GB 32X.....	1398.89
400/PII 64MB 8GB 32X.....	1918.46
450/PII 64MB 8GB 32X.....	1998.89

HP VE Series desktops

300 Celeron 32MB 3.2GB.....	969.45
300 Celeron 32MB 3.2GB 10/100.....	998.87

HP VE Series mini-towers

300 Celeron 32MB 3.2GB.....	969.45
300 Celeron 32MB 3.2GB 32X.....	1098.67

HP VL Series desktops

333/PII 32MB 4.3GB.....	1418.57
450/PII 64MB 10.1GB.....	2439.97

HP VL Series mini-towers

333 Celeron 64MB 4.3GB 32X.....	1499.85
450/PII 64MB 6.4GB 32X.....	2265.89

Acer

300/PII 32MB 4.3GB.....	799.08
333/PII 32MB 6.4GB 32X 10/100.....	1069.77
400/Pentium II 32MB 8.4GB 32X.....	1525.46
266/PII 32MB 4GB 24X.....	1129.43
300/PII 32MB 4GB 24X.....	1169.68

IBM

300 Celeron 32MB 3.2GB.....	969.70
333 Celeron 32MB 3.2GB.....	949.08
333/PII 32MB 3.2GB.....	1219.32
350/PII 32MB 3.2GB NT.....	1275.70
350/PII 64 3.2GB NT.....	1499.42
350/PII 32MB 3.2GB.....	1359.25
400/PII 64MB 6.4GB NT.....	1739.05
450/PII 64MB 6.4GB NT.....	1888.26

PC 300GL Series desktops

300 Celeron 32MB 4.3GB.....	909.57
333 Celeron 32MB 4.3GB.....	965.35
333 Celeron 64MB 6.4GB 32X.....	1266.63
350/PII 64MB 4.3GB.....	1315.14
350/PII 64MB 10GB 32X.....	1638.56
400/PII 64MB 10GB 32X.....	1779.62
450/PII 64MB 10GB 32X.....	1898.56

PC 300GL Series mini-tower

333 Celeron 32MB 3.2GB Win 98.....	975.24
350/PII 64MB 6.4GB 32X NT.....	1739.05
400/PII 64MB 6.4GB 32X NT.....	1859.68

PC 300PL Series mini-towers

350/PII 64MB 4.2GB.....	1749.03
32X 10/100 NT.....	1749.03
400/PII 64MB 6.4GB.....	1938.55
32X 10/100 NT.....	1938.55
450/PII 64MB 6.4GB.....	2238.46
32X 10/100 NT.....	2238.46

PC 300PL Series desktops

350/PII 64MB 6.4GB.....	1798.92
32X 10/100 NT.....	1798.92

350/PII 32MB 4.2GB.....	1479.40
10/100 Win 98.....	1479.40

400/PII 64MB 6.4GB.....	1956.99
32X 10/100 NT.....	1956.99

450/PII 64MB 6.4GB.....	2216.51
32X NT.....	2216.51

PC 300GL Series mini-tower

333 Celeron 32MB 3.2GB Win 98.....	975.24
350/PII 64MB 6.4GB 32X NT.....	1739.05
400/PII 64MB 6.4GB 32X NT.....	1859.68

PC 300PL Series mini-towers

350/PII 64MB 4.2GB.....	1749.03
32X 10/100 NT.....	1749.03
400/PII 64MB 6.4GB.....	1938.55
32X 10/100 NT.....	1938.55
450/PII 64MB 6.4GB.....	2238.46
32X 10/100 NT.....	2238.46

TOSHIBA

Equium 7000D

◆ 300MHz Intel Pentium® II processor ◆ 512KB cache ◆ 32MB RAM standard ◆ 4GB hard drive ◆ 24X CD-ROM drive ◆ Windows® 95	\$1168.68 CDW 109257
--	----------------------

HP Brio Series mini-towers

300 Celeron 32MB 2.1GB 32X.....	999.62
333 Celeron 32MB 4.3GB 32X.....	997.75
333 Celeron 64MB 8GB 32X.....	1359.29
333 Celeron 32MB 4.3GB 32X.....	1264.51
333/PII 32MB 4.3GB 32X.....	1398.89
400/PII 64MB 8GB 32X.....	1918.46
450/PII 64MB 8GB 32X.....	1998.89

HP VE Series desktops

300 Celeron 32MB 3.2GB.....	969.45
300 Celeron 32MB 3.2GB 10/100.....	998.87

HP VE Series mini-towers

300 Celeron 32MB 3.2GB.....	969.45
300 Celeron 32MB 3.2GB 32X.....	1098.67

HP VL Series desktops

333/PII 32MB 4.3GB.....	1418.57
450/PII 64MB 10.1GB.....	2439.97

HP VL Series mini-towers

333 Celeron 64MB 4.3GB 32X.....	1499.85
450/PII 64MB 6.4GB 32X.....	2265.89

Acer

300/PII 32MB 4.3GB.....	799.08
333/PII 32MB 6.4GB 32X 10/100.....	1069.77
400/Pentium II 32MB 8.4GB 32X.....	1525.46
266/PII 32MB 4GB 24X.....	1129.43
300/PII 32MB 4GB 24X.....	1169.68

Notebooks

COMPAQ Armada 1700

◆ 233MHz Intel Pentium® II processor ◆ 4GB hard drive ◆ 32MB RAM standard ◆ 12.1" active-matrix display ◆ 24X Max CD-ROM drive ◆ Integrated 56K bps (K56flex) modem ◆ Windows® 95	\$2257.36 CDW 117882
---	----------------------

TOSHIBA

Libretto mini-notebooks

70CT 120/MMX 16MB.....	997.56
1.5GB 6.1" AM.....	997.56
100CT 166/MMX 32MB.....	1487.56
2GB 7.1" AM.....	1487.56

Satellite & Satellite Pro notebooks

490CDT 233/MMX 32MB.....	2537.36
4GB 12.1" AM 20X.....	2537.36
330CDS 266/MMX 32MB.....	1467.25
4GB 12.1" DS 20X.....	1467.25
330CDT 266/MMX 32MB.....	1727.36
4GB 12.1" AM 20X.....	1727.36
490XCDT 266/PPI 32MB.....	2647.36
4GB 12.1" AM.....	2647.36
4000CDS 233/PPI 32MB.....	1667.23
4.1GB 12.1" DS.....	1667.23
4000CDT 233/PPI 32MB.....	1817.56
4.1GB 12.1" AM.....	1817.56

Tecra notebooks

550CDT 266/MMX 32MB.....	3167.45
3.8GB 12.1" AM.....	3167.45
780CDM 266/PPI 64MB.....	3867.56
5.1GB 13.3" AM 20X.....	3867.56
780DVD 266/MMX 64MB.....	4267.56
5.1GB 13.3" AM DVD.....	4267.56
780DVD 266/MMX 64MB.....	4597.86
8.1GB 13.3" AM DVD.....	4597.86
8000CT 233/PPI 64MB.....	2727.69
4GB 12.1" AM 24X.....	2727.69
8000CT 266/PPI 64MB.....	3397.56
4GB 12.1" AM 24X.....	3397.56

Portege notebooks

320CT 266/MMX 32MB.....	2717.36
3.8GB 10.4" AM.....	2717.36
7000CT 266/PPI 32MB.....	2987.56
4.3GB 12.1" AM NT.....	2987.56
7000CT 266/PPI 32MB.....	2987.56
4.3GB 12.1" AM.....	2987.56

Acer

Extensa notebooks

367T 200/MMX 32MB.....	1447.23
2.1GB 12.1" AM 20X.....	1447.23
368D 233/MMX 32MB.....	1297.36
3.2GB 12.1" DS 20X.....	1297.36
710DX 233/PPI 32MB.....	1497.56
2.1GB 12.1" DS.....	1497.56
710T 233/PPI 32MB.....	1987.23
3.2GB 12.1" AM.....	1987.23
711TE 266/PPI 32MB.....	2697.56
4.1GB 13.3" AM 24X.....	2697.56

COMPAQ

Armada notebooks

1700 300/PPI 32MB.....	3767.26
5GB 14.1" AM 24X.....	3767.26
3500 266/PPI 32MB.....	3217.56
4.1GB 12.1" AM.....	3217.56
3500 300/PPI 64MB.....	4197.56
6.4GB 13.3" AM.....	4197.56
6500 300/PPI 64MB.....	4867.56
6.4GB 14.1" AM 24X.....	4867.56
6500 300/PPI 64MB.....	4867.56
6.4GB 14.1" AM 24X WNT.....	4867.56
7400 300/PPI 64MB.....	4067.23
6.4GB 13.3" AM 24X.....	4067.23
7800 266/PPI 64MB.....	3997.56
5GB 13.3" AM 20X.....	3997.56
7800 266/PPI 64MB.....	4257.23
5GB 13.3" AM 20X.....	4257.23

IBM

ThinkPad notebooks

380Z 233/PPI 32MB.....	2457.56
4GB 13.3" AM 24X.....	2457.56
380Z 300/PPI 32MB.....	3037.26
4GB 13.3" AM 24X.....	3037.26
380Z 300/MMX 32MB.....	3127.56
4GB 13.3" AM 24X NT.....	3127.56
380Z 233/PPI 32MB.....	2567.56
4GB 13.3" AM 24X NT.....	2567.56
560Z 233/PPI 32MB.....	2667.36
4GB 12.1" AM.....	2667.36
560Z 300/PPI 64MB.....	3637.56
6.4GB 12.1" AM.....	3637.56
600 233/PPI 32MB.....	3057.23
3.2GB 13.3" AM 24X.....	3057.23
600 266/PPI 32MB.....	3497.56
4GB 13.3" AM 24X.....	3497.56
770X 300/PPI 128MB.....	5697.86
8.1GB 13.7" AM DVD.....	5697.86
770X 300/PPI 128MB.....	5697.23
8.1GB 13.7" AM DVD NT.....	5697.23

FUJITSU

LifeBook Series notebooks

690Tx 266/MMX 32MB.....	2299.00
4GB 12.1" AM 20X.....	2299.00
790Tx 266/MMX 32MB.....	1799.00
4GB 12.1" AM 20X.....	1799.00
990Tx 266/PPI 32MB.....	2999.00
5GB 13.3" AM 20X.....	2999.00

HITACHI

VisionBook Series notebooks

Traveler 133/MMX 24MB.....	1547.26
1GB 8.4" AM.....	1547.26
7590 266/MMX 48MB.....	2499.00
5GB 13.3" AM 20X.....	2499.00

AMS Tech

Rodeo 1000CT

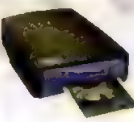
◆ 266MHz Intel Pentium® II processor ◆ 32MB RAM standard ◆ 4GB hard drive ◆ 12.1" active-matrix display ◆ 24X CD-ROM ◆ 56K bps modem ◆ lithium ion battery ◆ Windows® 98	\$1987.56 CDW 131640
--	----------------------

AMS Tech

TravelPro 2550CT 266/MMX

32MB 4GB 12.1" AM 24X.....	1697.56
Roadster 15CT 266/MMX.....	1597.36
32MB 3.1GB 12.1" AM 24X.....	1597.36
Roadster 15CX 266/MMX.....	1697.11
32MB 3.1GB 13.3" AM 24X.....	1697.11

AM = active-matrix color



Polaroid ColorShot
Digital Photo Printer

Polaroid's new ColorShot D data photo printer gives you instant prints with stunning color and clarity. From your PC in just 15 seconds. The lightweight, compact ColorShot Digital Instant Printer gives you all the image clarity and brilliant color of a real photograph.

USB **\$244.62** CDW 117319
Parallel **\$244.62** CDW 131723

3Com

Easy migration to high-speed performance

Four-port, automatic speed and cable quality detection

Optional management capability

Hot-swap feature

Back-up power supplies

3Com 5 Lifetime Limited Warranty

12-port **\$719.13** CDW 106557
24-port **\$1039.80** CDW 106558

Simple Technology

Data Transfer/External HD KII

Automatically format and mirror your hard drive

From 5.25" to a new hard drive

No more floppy swapping or reinstalling Windows. Connects to parallel port

\$69.83 CDW 96056

SimpleTech also available with 2 GB 3.0GB 4 GB and 5 GB hard drive. Call your CDW account manager

SimpleDrive



56K Faxmodem

Experience the Internet like never before! Grab graphics-rich web pages, huge data files, play intense games, increase productivity online and more. Compatible with 56K standard and x2 technology. Includes CD ROM software for work and play

Internal **\$127.99** CDW 107570
External **\$147.99** CDW 107571

Peripherals

NETWORKING PRODUCTS

Fast EtherLink XL 10/100 PCI NIC **\$68.74**
Fast EtherLink XL 10/100 PCI 5 pack **\$397.96**
EtherLink III 10BT PC Card **\$110.99**
Fast EtherLink XL 10/100 PC Card **\$58.24**
OfficeConnect Hub 8-TPO **\$79.31**
SuperStack II DS Hub 500 24-port **\$1049.80**
SuperStack II Switch 3300 24-port **\$2169.03**
Impact IQ ISDN modem **\$209.46**
Office Connect LAN Modem **\$389.20**

CDW SECURITY

Catalyst 2916M-XL 16-port 10/100 switch **\$219.46**
Catalyst 2924A 24-port 10/100 switch **\$1069.15**
1601 Ethernet Serial Modular Router **\$1149.67**
1602 56K Modular Router **\$1296.45**
1600 IP IPX AT Feature Pack **\$169.04**
2501 Ethernet Dual Serial Router **\$1725.24**
2524 Ethernet Modular Router **\$1578.22**
2500 IP Feature Pack **\$149.02**

COMPAQ

ProSignia 300 servers

300/P11 32MB 16X SCSI 10/100 Enet **\$1666.46**
300/P11 32MB 4 3GB 16X SCSI 10/100 Enet **\$1944.23**
300/P11 64MB 4.3GB 16X 10/100 56K **\$4389.96**

ProLiant 1600 and 1600R servers

300/P11 64MB no hdd 10/100 Enet **\$2579.52**
300/P11 64MB 10/100 RACK **\$3016.30**
400/P11 64MB 16X 10/100 Ethernet **\$2798.91**
450/P11 64MB 16X 10/100 Ethernet **\$3184.09**

HP NetServer E50 servers

300/P11 NO HD 32MB **\$1607.88**
300/P11 64MB 4.2GB **\$1976.57**
300/P11 64MB/TBU 4.2GB **\$2198.55**
333/P11 64MB 4.3GB **\$1859.33**
333/P11 64MB 4.3GB **\$2147.95**
333/P11 64MB 4.2GB **\$2369.99**

IBM

Netfinity 3000 Series Servers

300/P11 32MB 32X **\$1939.57**
300/P11 64MB 4.5GB 32X **\$2289.84**
350/P11 64MB 32X **\$2195.99**
350/P11 64MB 32X **\$2598.78**
400/P11 64MB 32X **\$3168.13**

Netfinity 3500 Series Servers

333/P11 64MB 24X **\$2195.00**

DATA STORAGE

ionega

Zip drive 100MB parallel **\$119.95**
Zip drive 100MB external SCSI **\$119.95**
ZipPlus drive 100MB external **\$169.95**
Jaz drive 1GB internal SCSI-2 **\$279.95**
Jaz drive 1GB external SCSI-2 **\$299.95**
Jaz 2GB internal SCSI-2 **\$399.95**
Jaz 2GB external SCSI-2 **\$399.95**
Ditto drive 2GB internal **\$119.95**
Ditto drive 2GB external **\$169.95**
Ditto Dash Card **\$99.95**
Ditto 3GB tape cartridge **\$24.95**
Ditto Max up to 7GB internal **\$199.95**
Ditto Max up to 7GB external **\$199.95**
Ditto Max Professional up to 10GB int. **\$299.95**
Ditto Max Professional up to 10GB ext. **\$299.95**
Buz multimedia producer **\$199.95**

MEDEAN

8GB Snap! Server network storage attachment **\$58.11**
16GB Snap! Server network storage attachment **\$1679.50**
CD Net Universal 7-bay 32X CD ROM tower **\$399.05**
CD NetROM 7-bay 4/24X CD ROM tower **\$1288.43**

Micro Solutions

8X Bantam portable CD-ROM drive **\$197.36**
8X Bantam portable CD-ROM with sound **\$229.24**
24X Bantam portable CD-ROM drive **\$244.16**
24X Bantam portable CD-ROM with sound **\$275.96**
32X Backpack CD-ROM drive **\$218.63**
32X Backpack CD-ROM drive with sound **\$248.26**
PD CDR with sound **\$219.96**
8GB parallel Travan TR4 **\$365.17**

DIGITAL IMAGING

Agfa ePhoto 780 digital camera **\$379.32**
AgfaPhoto 1280 digital camera **\$599.00**
Epson PhotoPC 700 digital camera **\$599.00**
Hewlett Packard PhotoSmart C20 digital camera **\$359.00**
Kodak DC260 Zoom digital camera **\$99.00**
Microtek EyeStar videoconferencing camera **\$99.11**
Sony Mavica MVC-FD81 digital camera **\$79.00**
Minolta Dimage V digital camera **\$406.61**
Nikon Coolpix 900 digital camera **\$789.95**
With Duke Nukem **\$789.95**
Olympus D340L digital camera **\$499.00**
Olympus D-600L digital camera **\$899.00**
Hewlett Packard ScanJet 4100Cse **\$199.00**

SCANNERS

Epson Expression 836XL **\$2499.00**
Hewlett-Packard PhotoSmart photo scanner **\$399.00**
Hewlett-Packard 6200Cse scanner **\$399.00**
Hewlett-Packard ScanJet 5100Cse scanner **\$299.00**
Hewlett-Packard ScanJet 6250Cse scanner **\$499.00**
Microtek ScanMaker V310 **\$79.95**
Microtek ScanMaker X6EL legal scanner **\$238.52**
Minolta Dimage Scan Dual **\$578.81**
UMAX Astra 6105 **\$99.00**
UMAX Astra 1200S w/Photoshop LE **\$299.00**
UMAX Astra image w/MagicScan **\$385.00**
UMAX Astra 1220S flatbed PC-Mac **\$179.00**
Visioneer PaperPort 3100 flatbed **\$109.40**
Visioneer PaperPort 6000B flatbed **\$138.58**
Visioneer PaperPort Strobe **\$209.10**

PRINTERS

Canon

BJC-250 **\$129.00**
BJC80 portable **\$299.00**
BJC7004 **\$299.00**
MultiPASS L6000 print/fax/copy/scan **\$999.00**

EPSON

Stylus Color 440 **\$149.00**
Stylus Color 640 **\$199.00**
Stylus Color 740 **\$279.00**
Stylus Color 800 **\$249.00**
Stylus Color 850 **\$349.00**
Stylus Color 1520 **\$499.00**
Stylus Color 3000 **\$1999.00**
Stylus Photo 700 **\$249.00**
Stylus Photo EX **\$499.00**

HEWLETT PACKARD

HP DeskJet 340 portable **\$269.88**
HP DeskJet 712C color printer **\$249.00**
HP DeskJet 722C color printer **\$299.00**
HP DeskJet 1120Cse color printer **\$499.00**
HP LaserJet 6Pse printer **\$799.00**
HP LaserJet 6000se printer **\$1149.00**
Ditto Max up to 7GB internal **\$149.09**
HP LaserJet 8000 printer **\$2438.03**
HP PhotoSmart photo printer **\$299.00**

OKI

Okipage 6e LED page printer

Endless paper cassette/roll setup

paper clean

600 dpi

6 ppm print speed

2MB RAM

standard 1/8MB maximum

5 year warranty or LED printhead, 1-year Okidata Overnight Exchange

\$249.00 CDW 92742

LEXMARK

Color Jetprinter 5700 **\$249.38**
Optra E **\$194.27**
Optra S 1255 **\$969.71**
Optra S 1625 **\$1019.58**
Optra S 1855 **\$1104.15**
Optra S 2455 **\$1759.91**
Optra SC 1275 **\$2959.88**
Optra K 1220 **\$746.55**
Optra SE 3455 **\$2198.96**

OKI

Okuljet 2020 **\$149.00**
Okuljet 2050 Photo **\$199.00**
Okupage 4w **\$149.00**
Okupage 6e **\$249.00**
Okupage 8c **\$349.00**
Okupage 16n **\$699.00**
Okupage 10i **\$499.00**
Okupage 20 **\$999.00**

MONITORS

iyama VisionMaster 400 17" (16" view) 0.28mm **\$439.33**
iyama VisionMaster Pro 400 17" (16" view) 0.28mm AG **\$499.79**
iyama VisionMaster 450 19" (18" view) 0.28mm **\$599.27**
iyama VisionMaster 502 21" (19.5" view) 0.27mm **\$1034.14**
iyama VisionMaster Pro 502 21" (19.5" view) 0.28mm AG **\$1034.14**
iyama Pro Lite 38 15" LCD (15" view) **\$1185.02**
MAG InnoVision 410V2 14" (13.3" view) 0.28mm **\$124.18**
MAG InnoVision DJ530 15" (13.9" view) 0.28mm **\$189.60**
MAG InnoVision DJ702 17" (16.1" view) 0.28mm **\$275.59**
MAG InnoVision DJ800 19" (18" view) 0.28mm **\$529.38**
NEC MultiSync A500 15" (13.8" view) 0.25mm **\$228.99**
NEC MultiSync A700 17" (15.6" view) 0.25mm **\$408.85**
NEC MultiSync E1100x-21" (19.8" view) 0.28mm **\$1073.59**
NEC MultiSync LCD400 14.1" flat panel LCD **\$1199.56**
Philips Magnavox 107S 17" (15.9" view) 0.28mm **\$279.26**
Philips 151AX 15" (15" view) **\$179.09**
Pinnacle E950 15" (13.8" view) 0.28mm **\$359.39**
Pinnacle E972 17" (15.8" view) 0.28mm **\$584.91**
Sony Multiscan 100ES 15" (14" view) 0.25mm **\$267.42**
Sony Multiscan 200ES 17" (16" view) 0.25mm **\$439.89**
Sony Multiscan 400PS 19" (18" view) 0.25-0.27mm **\$336.31**
Sony Multiscan 500PS 21" (19.8" view) 0.26mm **\$339.99**
ViewSonic G771 17" (16" view) 0.27mm **\$334.97**
ViewSonic G653 15" (13.8" view) 0.28mm **\$255.74**
ViewSonic G773 17" (16" view) 0.26mm **\$359.12**
ViewSonic GA771 17" (16" view) 0.27mm w/links **\$449.96**
ViewSonic G5771 17" (16" view) 0.27mm **\$619.96**
ViewSonic G790 19" (18" view) 0.26mm **\$619.96**

PC CARDS

3Com Ethernet adapter w/ XJACK **\$177.79**
3Com LAN PC Card combo **\$177.99**
3Com 33 6K w/XJACK **\$175.87**
3Com 33 6K 10BT LAN+modem **\$275.67**
3Com 33 6K 10BT LAN+modem combo **\$304.25**
3Com 56K cellular w/XJACK **\$219.22**
Hayes ACCURA 56Kflex **\$188.30**
Hayes OPTIMA 56K **\$199.93**
Hayes OPTIMA 56K w/EZjack **\$195.24**
Intel EtherExpress PRO/100 16-bit PC Card Enet 56K **\$309.95**
Practical Peripherals 56Kflex cellular **\$128.76**
Simple 33.6K Communicator w/SimpleJack **\$104.65**
Simple 33.6K cellular **\$108.48**
Simple 56K Communicator **\$118.81**
Simple 56K Communicator Pro w/SimpleJack **\$129.69**
Xircor 56K **\$149.86**
Xircor 10/100+modem 56K **\$305.36**
Xircor 10/100+modem 56K w/MiniDock **\$309.45**

MODEMS

56K x2 internal **\$209.40**
56K x2 external **\$207.93**

3Com U.S. Robotics

Winmodem V.34 33 6K internal w/fax **\$14.44**
V.34 33 6K internal w/fax **\$7.29**
V.34 33 6K external w/fax **\$106.58**
Voice V.34 33 6K internal w/fax **\$116.41**
Voice V.34 33 6K external w/fax **\$139.42**
56K V.90 internal **\$127.99**
56K V.90 external **\$147.99**
56K V.90 Voice internal **\$147.99**
56K V.90 Voice external **\$197.95**
56K Winmodem V.90 **\$89.00**
ISDN 128K terminal adapter **\$79.21**

Hayes

ACCURA 56K internal **\$138.13**
ACCURA 56K V.90 external **\$129.94**
ACCURA 56K speakerphone internal **\$149.01**
ACCURA 56K speakerphone external **\$124.08**
OPTIMA 56K external **\$289.80**
ACCURA ISDN **\$234.00**

UPS SYSTEMS

APC

Back-UPS Pro 420 PNP **\$149.31**
Back-UPS Pro 650 PNP **\$274.26**
SurgeArrest Personal **\$22.48**
SurgeArrest Professional **\$139.29**
SurgeArrest Network **\$32.21**

HANDHELD PCs

3Com PalmPilot Professional **\$237.26**
3Com PalmPilot II **\$347.86**
Hewlett-Packard 360LX Palmtop PC **\$473.33**
Hewlett-Packard 620LX Palmtop PC **\$473.36**

CDW DIRECTORY

PC sales 800-800-4239
Mac sales 800-622-4239
Corporate sales 800-280-4239
Corporate software sales 800-294-4239
Government and Education sales 800-808-4239
Networking sales 800-377-4239

CDW TELEPHONE HOURS

Sales
Monday-Friday 7 a.m.-9 p.m. CT
Saturday 9 a.m.-5 p.m. CT
Tech Support/Returns for Customers 800-383-4239
Monday-Friday 7 a.m.-9 p.m. CT
Saturday 9 a.m.-5 p.m. CT

BUY WITH CONFIDENCE CDW IS A TRUSTED COMPANY

TICKET SYMBOL CDW D & B Retail #1 Data 10-762-7052

Credit card charges are not submitted until date of shipment. For your protection, we ship only to your credit card's verified billing address. Shipping and handling charges apply. Please ask your CDW account manager for details. Before returning any product, you must obtain an RMA number. Non-defective returns are subject to a restocking fee. Software chips and other electronic components are non-returnable. All items are returned to the shipping address (except for return of CDW equipment) to be checked for all price, product and offer. CDW reserves the right to make adjustments due to changing market conditions, product discontinuation, manufacturing group changes, errors in advertising and other extraordinary circumstances. All trademarks and registered trademarks are the sole property of their respective owners.

800-326-4239

www.cdw.com

Computing Solutions

Built for Business™

Choose 360 at www.pcmag.com/infotlink

**Just when you thought you couldn't possibly
get any more out of this**



there's this.



The Benchmark

If you want more information about a product in PC Magazine, and you want it fast, check out Infolink – our new online product index and information request service – at www.pcmag.com/infolink. You can use it to get additional information on any of the products written about or advertised in PC Magazine, and have that information sent any way you like – e-mail, postal mail, or a telephone call. Plus, with Infolink, you can link directly to vendors' Web sites.

Infolink is your personal link to the most comprehensive product information available anywhere. Get connected at www.pcmag.com/infolink today.

MORE INFORMATION AND LINKS JUST ONE URL AWAY — WHEN YOU NEED MORE INFORMATION TO MAKE YOUR buying decisions than these ads provide, go to **ZD Marketplace**. Search a database of hundreds of ads by company, product and/or key words. Vendors can update their prices and product offerings daily. Plus, link to the web sites of advertisers for even more information. (Look for **ZD Marketplace**, under the ads in this section.) Bookmark <http://zdmarketplace.computershopper.com> for more ads, more information and links to advertiser web sites.

HARDWARE

PRICED CLASSIFIED

Batteries.....	391
Boards/Components/Chips	374.....390
Communications	375
Computer Systems	375.....392
Input/Data Acquisition/Barcode/POS	379.....392
Internet Tools/Utilities	376
Mass Storage Devices	381
Music/MIDI.....	377
Networking.....	380
Peripherals	377.....390
Presentation Equipment.....	378
Video.....	381

SOFTWARE

PRICED CLASSIFIED

Barcode.....	394
Business Applications.....	384
Business Utilities	
Communications	
Education.....	382,84.....394
Entertainment/Games	
Financial/Accounting	384
General.....	393
Graphics/Design/CAD	
Internet Tools/Utilities	
Multi-Media	381
Network Management.....	

Scientific/Engineering.....	
Security	395
Training	383
Adult	398

SERVICES

PRICED CLASSIFIED

Data Conversion/Data Recovery	395
On-Line.....	373,84
Software Duplication.....	396

MISCELLANEOUS

PRICED CLASSIFIED

Supplies	392
----------------	-----------

MARKETPLACE SALES — 800-825-4237

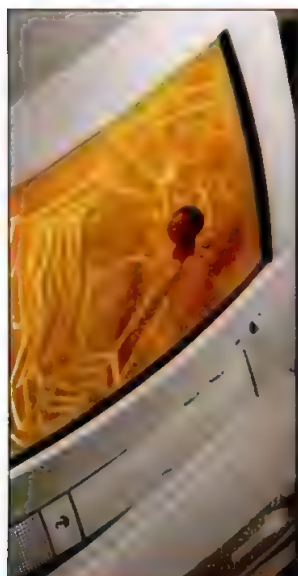
• South America •
Tel: 011 54 2 211 1111
sa_sales@zdl.com

• Europe & Asia •
Tel: 011 44 181 511 1111
europa_sales@zdl.com

• Japan & Australia •
Tel: 011 61 2 911 1111
jp_aus_sales@zdl.com

• Canada & Mexico •
Tel: 011 1 800 825 4237
can_mex_sales@zdl.com

• Asia Pacific •
Tel: 011 61 2 911 1111
asia_pacific@zdl.com



Your own
web site
can make
you very
attractive
at a very
attractive
price

FOR AS LOW AS \$14.95 IDT will host your web site on the #1 rated Internet backbone by the Wall Street Journal with over 99% up-time, live tech support, no minimum contracts and a "host" of extras. Whether your needs are business or personal, there's no better way to attract your target audience than with an IDT-hosted web site. For complete details call (800) 545-9135.



Internet Data Transfer
100% Uptime Guarantee
24/7 Tech Support
No Minimum Contracts
No Hidden Fees

ZD Marketplace



**MORE
TEETH**
From Your
WEB HOST

More than a mouthful from **\$19.95**
per month

FEATURES:

- Free Domain Name Registration
- 50 MB of Storage
- 3000 MB of Transfer
- 20 Email Accounts
- Email Autoresponders/Forwarding
- 24/7 Phone & Web Support
- Active Server Pages
- Detailed Site Statistics
- CGI-BIN
- SSL Secure Server
- Database Hosting
- MS Access & SQL
- Complete E-Commerce Solution
- CyberCam/Hotelling Call
- Streaming Audio/Video
- Cold Fusion
- MS Index Server and MetaWeb
- Multiple Fiber Optic T-3s
- 99.9% Uptime Guarantee
- Same Day Setup
- 24/7 Tech Support
- Daily Tape Backup
- 30 Day Money Back Guarantee
- "Car Today!"

1-800-785-6170
(561) 984-3605 • <http://www.eipc.net>

"Ask about our profitable reseller program!"

Worldwide Internet

ZD Marketplace



GET THE TOTAL NETWORK SOLUTION!

Networking Products, Design and Nationwide Installation

Whether you're looking for a couple of patch cords or an entire network solution, Lastar has what you need. We carry only the finest products and offer end-to-end services including network design and installation to meet your data communication requirements. Call us today to learn more about:

We Proudly Sell and Install...

CISCO SYSTEMS MOD-TAP 3Com HITACHI TRANSITION

Call Lastar at 888-297-8890 or visit our website at www.lastar.net

ZD Marketplace

BIOS UPGRADES

INSTANT COMPATIBILITY
WITH ALL THE LATEST
HARDWARE/SOFTWARE
by REPLACING ONE CHIP!

800.800.BIOS

FREE catalog • FREE Technical Support • FREE chip puller tool • FREE "BIOS SECRETS" guide

UNICORE WE BEAT ANY COMPETITOR'S PRICE!
Email Orders at <http://www.unicore.com>

PHONE: 978-686-6468
FAX: 978-683-1630
WEB: <http://www.unicore.com>

Returns may be subject to restocking fees.
All trademarks and registered trademarks are property of their respective owners.

ZD Marketplace

50+ motherboards

New Motherboard Comparison Tables!

award-winning systems & peripherals
hundreds of detailed specifications

24 hours a day, 7 days a week one web site

www.aberdeeninc.com/mag
888-453-0707

ABERDEEN mag80326

ZD Marketplace

American Computer Company announces:

The Cure for the common Floppy

Pentium PCs From \$500

LOW PRICES UNLIMITED TECH SUPPORT
3 YEAR WARRANTY

Pentium Laptops From \$1499

83 Times Capacity!!

Works with 120MB SuperDisk™ diskettes and your old floppies, too!

Get Plenty of Rest, and Call Us in the Morning!

120 MB SuperDisks on ALL American Computers II

800-850-7710 <http://accpc.com>

ZD Marketplace

CHEAP SOFTWARE

TOLL FREE **888-999-2611** No Sales Tax www.cheapsoftware.net
FAX 310-305-3645

Some Day Shipping Money Back Guarantee

MICROSOFT	
Office 97 Pro CD-Manual	\$249
Office 97 Pro Single License	\$179
Office 97 Pro Small Business Ed. Ver. 2.0 w/ Pub 98	\$229
Windows 98 or Win 95 CD-Manual Full Version	\$99
Windows 98 single user license & manual	\$75
Word 97, Publisher 97, Works 4.0 & Bookshelf 97	\$119
Works 4.5 & Money 98 cd	\$42
Project 98 Full Ver. Retail Box CD-Manual-License	\$289
Visual C++ Pro 6.0 Full Ver. CD-Manual	\$199
Visual Basic Pro 6.0 Full Ver. CD-Manual	\$199
Visual Studio Enterprise 6.0 Full Ver. CD-Manual	\$695
NT Workstation 4.0 CD-Manual-License	\$169
NT Server 4.0 w/CD-Manual-License	\$599
NT Server 4.0 20 Client License Pack	\$349
BackOffice 4.0 Small Business Server-35 Client	\$1495
BackOffice Server 4.0 w/ Client License	\$1295
ADOBE	
Pagemaker 6.5 Full Version	\$349
Premier 5.0 Full Version	\$349
Photoshop 5.0 Full Version	\$349
Illustrator 7.0 Full Version	\$299
COREL/LOTUS BUNDLES	
Wordperfect Office 8.0 & Lotus 1-2-3	\$129
Lotus SmartSuite 2000 w/CD-License	\$119
Wordperfect Office Suite 8.0 w/ Dragon NaturallySpeaking	\$169
CorelDraw 8.0 CD-Man w/Photopaint/Dream 3D	\$299
SYMANTEC	
Norton Anti-Virus 5.0 w/CD-Manual-License, Full Version	\$69
PCAnywhere 32 8.0 Host & Remote w/CD-Manual-Lic	\$69
ACT 4.0 w/CD-Manual-License, Full Version	\$129

Corporate POs & CO-OP WELCOME

DEALER INQUIRIES WELCOME

PACIFIC STANDARD TIME MONDAY - SATURDAY 7AM-5PM

SoftMan Products Co
12854 W. Washington Blvd. LA, CA 90066

ZD Marketplace

ONE LINK TO HUNDREDS OF VENDORS

Go to <http://marketplace.computershopper.com>

Marketplace **COMPUTER SHOPPER**

To fully appreciate the value of
our hot **FAX SERVER** software
visit our web site. In the
meantime this will
give you an idea
of what to
expect.



www.faxserver.com

ZD Marketplace

Breakthrough

In Keyboard
Monitor
Switches

Multi Platform &
On-Screen Display



BREAKTHROUGH the clutter of multiple keyboards, monitors, and mice with this latest **INNOVATION** from Rose. This switch has every feature you asked for:

Switches several servers or computers to a single monitor, keyboard, and mouse

Supports any mix of PC, Apple, Sun, RS 6000, HP 700 series, DEC Alpha, SGI, or other computers from any keyboard or mouse

Front panel has keypad for easy selection of computers and configuration

Front panel display shows computers name and other information

Command to switch can come from keyboard, front panel, or RS232 port

Simple to use keystrokes switch computers for fast and easy control

Built in daisy-chaining supports up to 256 computers

Flash memory for future upgrade of features

Easy to use **OverView™** system gives control and status with on-screen graphics

Many other features!

CALL FOR A FREE CATALOG:

- Keyboard/Video Control
- Print Servers
- Data Switches

800-333-9343

VISIT OUR WEB SITE AT WWW.ROSEL.COM



10707 STANLEY ROAD HOUSTON, TEXAS 77099 TEL 281-933-7673 FAX 281-933-0044

Power Computing Across THE ENTERPRISE & Beyond
Admax

World's #1 Manufacturer of Rugged Desktop, Super Tower
& Rackmount Industrial Computer Servers & Workstations

For Mission Critical Applications

Up to 18 PCI slots available • Intel Pentium® II up to 450 MHz • Industrial SOC's

We Can
Change
Your World!



ADMAX S861R config-A

Rugged industrial computer with

Year 2000
Ready

- Intel 300MHz Pentium® II w/512K ECC Cache (Expandable to 2 Processors)
- ECC Memory System w/ 128MB of EDO Buffered DIMM expandable to 512MB
- 4GB UltraDMA IDE Hard Drive
- 32X max. IDE CDROM
- 3.5" 1.44MB Diskette Drive
- 3COM PCI 10/100 Twisted Pair Ethernet Slots: Five 32bit PCI, Two ISA, One AGP Integrated 32bit PCI Graphics /ZMBDRAM
- 104+ Keyboard & PS/2
- Compatible Mouse & Mouse Pad
- 5 Year Parts Warranty and 30 day
- Network Operating System Support
- Shock & vibration proof
- Dust proof for harsh environments

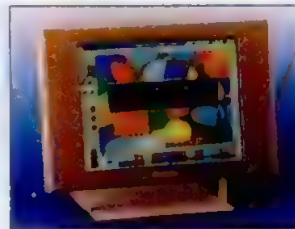
\$1299

Fault-Tolerant, Fault-Resilient NT or UNIX Systems

Options:

- Fault-Tolerant, Redundant Enterprise Systems with up to 1200 watts hot swappable power supply, (up to 24 removable hot-swappable drives options available).
- Built-in Fan failure audio alarm. Temperature sensors w/LED flash indicators.
- Rackmounts all have vibration and shock mount drive protection.
- EMI/RFI shielded chassis.
- 12-slots, 14-slots, 18-slots & 26-slots PCI/ISA bus options.
- Rackmount RAID ARRAY Systems
- RACKMOUNT INDUSTRIAL MONITORS
- RACKMOUNT KEYBOARDS
- RACKMOUNT 8 to 32 RS-232 or RS-422 serial ports RAS (Options available)

Touch Flat Monitors



Applications:

Factory Automation
Inventory Control
Mobile
Machine Control
POS & More

- 6.4" to 15.1" diagonal sizes
- High Bright with Auto Dimming
- ISA, PC104, PCI or Analog-RGB
- Resistive or Capacitive Touch

GOUNDER TECHNOLOGIES INC

888-855-9065 Fax 847-236-0300

www.goundertech.com

ZD Marketplace

[NNATECH.COM]

Wanted

An intelligent, computer-literate customer who only wants great service and products for the best possible price.

Visit **NNA Technologies**
Computer Super Store
at www.nnatech.com
or call **1.888.662.8484**

ZD Marketplace

THANKS FOR SHARING.



Introducing **SOHOLink**

- Easy, Inexpensive Network Connectivity
- Printer Sharing • SHARED INTERNET ACCESS
- Fax/Modem Sharing • Other Models Available

SOHOLINK

See us at #53363
COMDEX FALL '98

PROTEC

297 Labrosse, Pointe Claire
Quebec, Canada H9R 1A3

800-363-8156 ext 245

www.protec.ca

514-630-5832 • Fax 514-630-2987

email: sales@protec.ca

ZD Marketplace

PROXIMITY BASED PRIVACY

What if your PC
secured itself everytime you stepped away?

AIR ID.

Award Winning Proximity Activated Identification



- Step away from your PC; within seconds the PC is secured... automatically!
- Return to your PC and access is granted!

"The device provides an unintrusive layer of security that will be most useful." — PC Week

"The theory is sound and the AIR ID unit we tested worked well." — LAN Times

\$149

COMPLETE SYSTEM

30 day
money back offer

ORDER NOW!
888-542-4743

Developer's Kit available

*After \$100 Mfr. mail in rebate.
Limit 10 per address.
Offer expires 12/31/98.

RF IDEAS INC.
Proximity Activated Identification
Web: www.RFIDeas.com

Ideal for Corporate • Human Resources • Patient Privacy • Government • Financial

Great for protecting Desktop • E-Mail • Payroll • The LAN

Supports Win 95/98/NT • CA Unicenter Single Sign-On • MID door access

ZD Marketplace

1-800-798-1880
www.csg2000.com

COMPUTER SERVICES		MEMORY		BEST PRICES
PROCESSORS				
Pentium II 450 MHz.	\$730	160 Pin SDRAM Reg. 32 megs \$40	64 megs \$83	128 megs \$104
Pentium II 480 MHz.	\$770	160 Pin SDRAM PC-100 32 megs \$42	64 megs \$87	128 megs \$108
Pentium II 350 MHz.	\$355	72 Pin Simms EDO	16 megs \$21	32 megs \$38
Pentium II 300 MHz.	\$281	72 Pin Simms Parity	16 megs \$24	32 megs \$39
Pentium II 266 MHz.	\$225			
K6-2 350 MHz. MMX	CALL			
K6-2 300 MHz. MMX	\$130			
K6 300 MHz. MMX	\$121			
K6 233 MHz. MMX	\$99			
K6 200 MHz. MMX	\$90			
		Pentium II MOTHERBOARDS		
		Asus P2-4 100 MHz. bus. 4 PCI. 3 ISA. 233 550 CPU USB. EIDE +IO. for ATX case 3 Channels \$140		
		Asus P2-4-S 100 MHz. bus. Ultra 2 SCSI 00 Mbits. 4 PCI 2 ISA EIDE +IO USB 10x ATX case \$290		
		DF-AX 100 MHz. bus. 4 PCI 3 ISA 233 550 CPU USB EIDE +IO. for ATX case 3 Channels \$145		
		MOTHERBOARD - SOCKET 7		
		DIP-MET 100 MHz. bus AGP slot. 3 PCI. 2 ISA. EIDE +IO USB 1 meg cache for AT or ATX cases \$95		
		Asus P5-4 100 MHz. bus AGP slot. 3 PCI. 2 ISA. EIDE +IO USB 512k cache for AT or ATX cases \$105		
HARD DRIVES		VIDEO CARDS		OTHER ITEMS
Western Dig 3.2 gig U-DMA	\$144	Diamond Viper V330 4 megs	\$70	MS Windows 95 Full Version
Western Dig 6.4 gig U-DMA	\$186	Diamond Stealth II 6400 8 megs	\$75	MS Office 97 Pro Full Version
Western Dig 8.4 gig U-DMA	\$229	Diamond Monoray 8 32.1 megs	\$75	Imaging 3.5 Drive IDE
Maxtor 5.0 gig U-DMA	\$174	Diamond Viper TNT V 550 16 megs	\$100	32x CD Rom SCSI
Maxtor 6.4 gig U-DMA	\$210	ATI 100 in Wonder Pro 8 megs	\$110	32x CD Rom IDE
Maxtor 11.0 gig U-DMA	\$294	ATI 100 in Wonder Pro 16 megs	\$120	Sound Blaster 504 Megas Voice V.90
		Matrox G-200 Millennium 8 megs	\$125	Sound Blaster 128 3D PCI

THIS IS A SMALL SAMPLE OF WHAT WE STOCK. CALL FOR A FREE CATALOG OR VISIT OUR WEBSITE.
1827 Harbor Blvd., #305 • Costa Mesa, CA 92627 • (714) 646-7029 Fax

ZD Marketplace

PC III PORTABLE COMPUTERS

For 15 years PC III has been the leader in portable technology.
We offer a Hi quality Reliable Lunch Box at an extremely affordable price!

- ▲ TFT/Dual Scan LCD Display
- ▲ 10.4"/12.1"/13.3" VGA/SVGA
- ▲ CPU: Pentium up to 233 MMX or Pentium II 300 MHz
- ▲ 6 Expansion Slots
- ▲ HDD: 1.6 GB to 9 GB
- ▲ RAM: 16 MB to 128 MB
- ▲ FDD/CD-ROM PCI 2 MB LCD Video Card
- ▲ Windows 95/Windows NT
- ▲ Portable with carrying handle
- ▲ All standard desktop components
- ▲ 23 lb — Easily moved

Customer Configurations Welcome!

Application:
Industry Portable Computer
Photo/Image Processing
Professional Instrument

Medical Instrument:
Laboratory PC
Control Automation
Portable Screen

PC PORTABLE MANUFACTURER INC. **800-818-2819**
<http://www.pc-portable.com> sales@pc-portable.com Fax: 626-444-1027

ZD Marketplace

Roland® MA-150U
USB Powered Speakers

USB **B** **One Cable,
One Solution!**

UNIVERSAL SERIAL BUS

Large Selection of
**Desk Top Media Production
Systems, Software &
MIDI Files!**

Roland® Super MPU64
64 Channel MIDI Processing Unit

Roland® UA-100
USB Audio/MIDI Processing Unit

COMDEX '98 Premier at the
THINKWARE
Booth #S3633
Dealer inquiries welcome

Distributed by
EDIROL

1-800-380-2580
www.edirol.com

VIDEO Canvas
VIDEO Canvas
SOUND Canvas

ZD Marketplace

DIRT CHEAP DRIVES
www.dirtcheapdrives.com
1-800-637-4743
PC Magazine
Dec A, 1998

We offer the best deals on drives in the industry. This is just a sampling of our best sellers. Check us out on the Web.

We are the #1 source for CD-R drives & supplies.

Our Best Selling CD-Recorder Deals

BEST CD-R DEAL!

	Panasonic	Caravelle
Bare Internal Drive Only	\$329/\$319	n/a / n/a
Int/Ext w-Software & 1 disk	\$359/\$349	\$729/\$619
Int/Ext w-ISA controller, software & 1 disk	\$369/\$399	\$779/\$649
Int/Ext w-PCI controller, software & 1 disk	\$339/\$429	\$809/\$699

The Panasonic 4x8 has a 1MB buffer. The Caravelle has a 2MB buffer. Both models feature tray loading. Int/Ext.

Our Best Selling CD-RWs Deals

BEST CD-RW DEAL!

	4x2x8	YAMAHA 4x4x16
Bare Internal Drive Only	\$299/\$309	\$349/\$339
Int/Ext w-Software & 1 disk	\$334/\$424	\$384/\$474
Int/Ext w-ISA controller, software & 1 disk	\$349/\$404	\$434/\$524
Int/Ext w-PCI controller, software & 1 disk	\$414/\$504	\$464/\$554

Both models feature a 2MB buffer and tray loading. Int/Ext.

Ultra IDE Hard Drives					
MB	Brand	RPM	Model	Int	Ext
2564MB	Quantum	5400	FB302500A	\$117	\$172
3221MB	Seagate	5400	ST33221A	\$128	\$183
4311MB	Western Digital	5400	WDAC24300	\$144	\$199
6448MB	Seagate	5400	WDAC36400	\$173	\$228
6530MB	Seagate	7200	ST36530A	\$198	\$253
7696MB	Quantum	5400	FB307600A	\$189	\$244
8606MB	Seagate	5400	ST38641A	\$199	\$254
9140MB	Seagate	7200	ST39140A	\$245	\$300
10100MB	IBM	7200	IBM10GX	\$275	\$330
10262MB	Quantum	5400	FB310200A	\$239	\$294
12750MB	Quantum	5400	FB312700A	\$249	\$304
13600MB	Maxtor	5400	M91360	\$305	\$360
16800MB	IBM	5400	IBM16GP	\$422	\$477
19000MB	Quantum	4000	BF19000A	\$329	\$384
Ultra SCSI Hard Drives					
MB	Brand	RPM	Model	Int	Ext
4550MB	Seagate	7200	ST34550N	\$255	\$315
4550MB	IBM	7200	IBM34560N	\$275	\$335
4550MB	Seagate	7200	ST34573N	\$455	\$515
9100MB	IBM	7200	IBM39130N	\$499	\$559
9190MB	Seagate	7200	ST39173N	\$525	\$585
Ultra Wide SCSI Hard Drives					
MB	Brand	RPM	Model	Int	Ext
4550MB	Quantum	7200	VK304550W	\$275	\$395
4550MB	IBM	7200	IBM34560W	\$275	\$395
9100MB	Quantum	7200	VK309100W	\$489	\$609
9190MB	Seagate	7200	ST39173W	\$525	\$645
9100MB	IBM	10,020	DV309100	\$585	\$705
Ultra-2 SCSI Hard Drives					
MB	Brand	RPM	Model	Int	Ext
4550MB	Quantum	7200	VK304550LW	\$289	\$419
9100MB	Quantum	7200	VK309100LW	\$489	\$609
9100MB	Seagate	10,000	ST39102LW	\$695	\$809
18200MB	Quantum	7200	XP318200LW	\$999	\$1119
18200MB	Seagate	70,000	ST118202LW	\$1299	\$1419
2.5" Laptop Hard Drives					
MB	Brand	RPM	Model	Int	Ext
2170MB	Toshiba	4200	MK2104MAV	\$195	\$279
4000MB	Toshiba	4200	MK4006MAV	\$279	\$379
8100MB	IBM	4900	DP28100	\$759	\$879

DVD Drives & Accessories

Smart Storage Solutions 3rd generation DVD complete kit

IDE 3rd generation DVD kit \$55DVDKIT \$239

Toshiba 3rd generation drive IDE 4.8X DVD reader SDM1202 \$149

Pioneer 2nd generation drive IDE/SCSI DVDAD02/DVAD02 \$125/\$179

Creative Labs encore DVD kit IDE DVD-2 reader & MPEG-2 decoder ENCOREDVDX \$239

Hollywood MPEG-2 Decoder Sigma Designs Real Magic \$129

WaveLink PC to TV transmitter View DVDs on your TV PCTOTV \$169

Removable Cartridge Drives

Iomega 100MB Zip with 1 Free Disk Internal IDE/SCSI ZIP100AC/ZIP100I \$99/\$119

External SCSI/Parallel ZIP100/PPZIP100 \$119/\$119

Iomega Jaz with 1 Free Disk 1GB Internal/External SCSI JAZI/JAZX \$250/\$265

2GB Internal/External SCSI JAZ2I/JAZ2X \$345/\$345

Optical Drives

Fujitsu 640MB w/ 2MB buffer and 1 Free Disk Internal/External SCSI DYNAM640Z/DYNAM640SE \$329/\$329

Maxopix 2.6GB TS-2600 \$1059 5.2GB TS-5200 \$1499

Tape Drives

4-GB Seagate Microcartridge AXTAPI with 1 Free Tape & SFT IDE / SCSI ST72000A/ST72000N \$199/\$235

Sony 4mm SCSI SDT7000 4-8GB \$559 SDT9000 12-24GB \$759

5-10GB Exabyte 8mm external SCSI EB80700J \$509

20-40GB/33-70GB Quantum DLT DLT4000/DLT7000 \$2299/\$5399

All major credit cards accepted. P.O. & Bill payments from government & Fortune 500 customers. Bundle prices good only if drive is sold at advertised price. Some exceptions may apply to one price guarantee. Prices & specifications subject to change without notice. Shipping charges are non-refundable. Returns must be in new condition and in original packaging. Defective items may not be returnable. All returns are subject to a restocking fee. No returns on software or special orders. Items not listed in ad. All products covered by manufacturer's warranty only. We reserve the right to refuse any sale. Personal checks held for clearance. All trademarks are registered trademarks of their respective companies. Full details on website. ©1998 DIRT Cheap Drives.

ZD Marketplace

BUY IT RIGHT!

From Your
AV MARKETPLACE

Call Today And You Get:

- Our 20 years of experience.
- FREE lifetime 1-800 tech support.
- FREE loaner units shipped overnight.

**30 DAY
MONEY BACK
GUARANTEE**
WE WILL
NOT BE
UNDERSOLD!



FREE All projectors include
FREE 2 Year Warranty and
FREE Dual Beam Laser Pointer!

InFocus®

DISCOUNTS! Ask about our **EDUCATIONAL** & **QUANTITY** Discounts.



**Only
6.8 lbs!**

INFOCUS LP425

SVGA (800 x 600) projector • 700 lumens! • 6.8 lbs

\$4450

DLP
A REAL DIGITAL TECHNOLOGY



FREE

Field Warranty
Service For
Lifetime

For True XGA order

INFOCUS LP725

SVGA (800 x 600) projector
750 lumens • 12 lbs.

\$4799

INFOCUS LP735

XGA (1024 x 768) projector
650 lumens • 12 lbs.

**Call For
Lowest Price**



Marketplace™

*Limitations may apply

Call Toll FREE **888-695-8128** Mon-Fri 8am-8pm EST. or online at www.avmarketplace.com/infocus



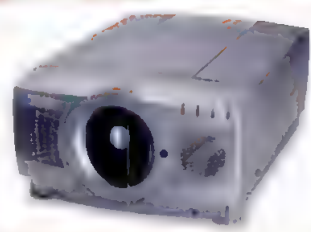
SELECTION, SELECTION, SELECTION

BETTER STILL, WE'LL HELP YOU MAKE THE RIGHT SELECTION

- Rent from us and try before you buy
- Huge inventory over 50 models available
- Best trained staff in the business
- Lifetime tech support
- No risk money back guarantee
- 60-day upgrade policy

ASK US ABOUT RENTALS

STEP OUT OF THE DARK AGE STEP UP TO BOXLIGHT

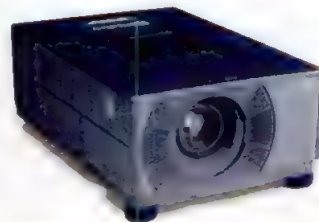


BRIGHT NEW STAR OF THE SILVER SCREEN

BOXLIGHT 9600

A new wave in theater-style technology. The BOXLIGHT 9600 is a brilliant, high-resolution projector that integrates easily into conference rooms and auditoriums. The 9600's new digital resolution technology expands to VGA, SVGA or compresses to SXGA automatically—just plug in and present. And, unlike three-gun and light valve projectors the 9600 needs no convergence or maintenance.

- 1600+ ANSI lumens—perfect for large venues
- Accepts virtually all major video and data formats
- True XGA with digital expansion or compression to VGA, SVGA or SXGA

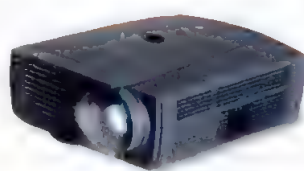


THE VERSATILE PORTABLE

BOXLIGHT CP-10t

Just when it seemed that portable projection couldn't get any more versatile, along comes the BOXLIGHT CP-10t. This light 8.6 lb unit packs 600 ANSI lumens, power zoom and focus, high resolution, a durable magnesium alloy frame, and—are you ready for this?—a PCMCIA storage slot. Just load your presentation onto a PCMCIA card and leave your computer at home for an even lighter load.

- 600 ANSI lumens
- 800 x 600 true SVGA and compression for 1024 x 768 XGA
- Power zoom and focus; PCMCIA storage slot



LIGHT, BRIGHT AND MOBILE

BOXLIGHT 4050

BOXLIGHT is proud to present the industry's first truly compact, ultra-bright SVGA personal projector. Weighing in at only 6.9 lbs, this mighty, multimedia machine lightens the luggage of even the most mobile presenter while packing enough wallop to allow dynamic "lights on" presentations. A powerful combination of performance, portability, and price, the BOXLIGHT 4050 is a sure winner.

- 700 ANSI lumens with built in keystone correction
- 800 x 600 true SVGA and compression for 1024 x 768 XGA
- Ultra-portable 6.9 lbs chassis

You'll find us on the internet at: www.boxlight.com/pcmag/

CALL TO ORDER: 1-800/730-5815
PROJECTOR RENTALS: 1-800/736-6954



Monday-Friday from 9am-5pm EST. Furniture orders accepted with a 5% deposit. Prices subject to change without notice. All items are sold on a "first come, first served" basis. Money back guarantee does not apply to custom orders and special orders. Boxlight does not hold any liability for computer-related damage. Boxlight and the Boxlight logo are registered trademarks of Boxlight Corporation. All other marks are the property of their respective owners.



Government: 800/ 497-4009 • Resellers: 800/ 736-6956 • International: 360/ 779-7901 • Rental: 800/ 736-6954 • Fax: 888/ 353-4242 • Education: 800/ 689-6676

STEP OUT OF THE DARK AGE STEP UP TO BOXLIGHT.



BOXLIGHT PRESENTS RENT AND RUN

AND ROAD PRESENTATIONS HAVE NEVER LOOKED BETTER

Nothing could be *easier* than renting state-of-the-art presentation equipment from BOXLIGHT. Your projector will be *where* you want it *when* you need it. After the presentation, use our convenient "label and leave" service and you'll be on *your way*.

We call it Rent and Run™ You'll call it fantastic

all major credit cards accepted
CALL FOR RENTALS AND INFORMATION
brouse: www.boxlight.com/pcmagazine/

1-800-736-6954

BOXLIGHT CORPORATION

- ▶ You'll have your projector when and where you need it, in the U.S. or Europe.
- ▶ Every system is tested for guaranteed performance.
- ▶ And your rental fee applies toward purchase within 30 days.
- ▶ Overnight delivery in the U.S.



Introducing MasterConsole II

The KVM switch that does everything but make the coffee!

Brains. Brawn. Beauty. This KVM switch has it all. Control for 4, 8, 16, up to 256 computers – PC, Mac, Sun, and others. On-screen user interface. Hi-res video. Password security. And a dedicated processor per channel for automatic computer booting and flawless operation.

As for the coffee, we'll take care of that when you call to learn more.

Call toll free 1-800-724-8090, X50. Or visit us online at www.raritan.com

Raritan

Receive a coupon good for a FREE cup of Dunkin' Donuts® coffee and choice of a donut, muffin, or bagel. Just mention Code 50 when requesting MasterConsole II information.

E-mail: sales@raritan.com Phone: 732-764-8886 Fax: 732-764-8887

Server Farm Management

starts with
Keyboard/Video & Mouse Switches.
Configured for Growth

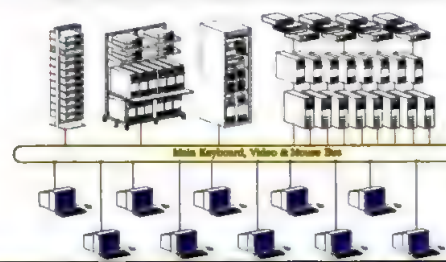
- Strategically position hardware
- Distribute KVM signals to the user
- Boost overall productivity
- Multi-vendor interoperability
- Enterprise Wide Solutions

As a worldwide leader, Tron provides powerful, high speed, quality system designs geared specifically to assist small and enterprise customers.

As a leading distributor, we feature the most popular products from the best manufacturers with a comprehensive knowledge of multi-product/vendor solutions.

Our success is built on innovative, forward thinking professionals with a commitment to value-added products and services.

Your Network Servers on KVM Switches



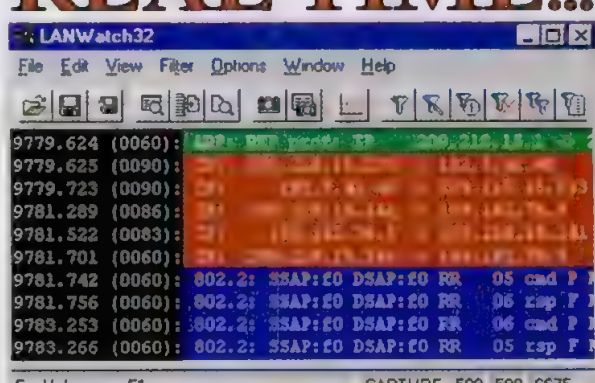
Call (800) 808-4672 for the only complete KVM catalog!

Get the Industry Standard White Paper on KVM Technology from our web site!

TRON INTERNATIONAL, INC. <http://www.tron.com>

All trademarks are the exclusive property of their respective owners.

Monitor Your Network in REAL TIME...



See your network traffic as it happens with LANWatch32™

Network Protocol Analyzer

for Windows 95, Windows 98, and Windows NT 4.0

Customize LANWatch! Source is included for Parsers and Filters!!

PRECISION Guesswork

Five Central Street, Topsfield, MA 01983
(978) 887-6570 (phone), (978) 887-6552 (fax)
<http://www.guesswork.com>

It takes more than great prices to be #1.

ADTECH represents only the most innovative LCD presentation products from the leading manufacturers — we buy right so you won't have to pay more. Our technically proficient salespeople provide turnkey solutions — not just hardware and prices. Give ADTECH a call for a refreshing buying experience and you'll find out why our customers keep coming back.

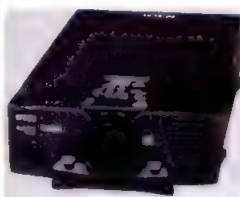
ADTECH
SALES • RENTALS • LEASING
800-419-0023

Tel: 508-358-0077 • Fax: 508-358-0066
Government Sales: 800-359-0077

Factory authorized service provided on every projector we sell.

Educational & Fleet Sale Pricing

Call for our FREE catalog!



CALL FOR SPECIAL LOW PRICE

Sub-10 lb. Performance Just Got Better

Epson PowerLite 5500C

- 800 x 600 Resolution
- 9 lbs. • 650 Lumens

Epson PowerLite 7000XB

- 1024 x 768 Resolution
- 650 Lumens • 14 lbs.

Epson PowerLite 7300

- 1024 x 768 Resolution
- 1200 Lumens • Only 13 lbs.

Call For Special Pricing!

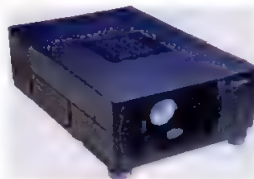


Lightware

- SVGA (800 x 600) Resolution
- 9 lbs. — Built for Travel
- Carry Case Included

VP800 \$1,995

MVP800 \$2,995

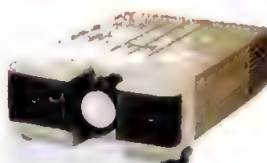


Sanyo PLC-SU10N

Hot New Projector — Only 8.6 lbs.

- SVGA Resolution
- 600 Lumens • Electronic Zoom

Call for Pricing



Sharp PG-D100U

- Full SVGA Resolution • High Brightness
- Slim Compact Design • 3 Year Warranty

Special Purchase
Now Only \$3,495

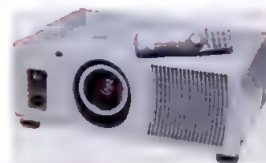
Call For Special Educational Discount



Toshiba G1

- XGA Resolution
- 800 Lumens
- Only 14 lbs.

XGA Resolution Breaks Price Barrier Only \$4,795



Panasonic PT-L585U

- SVGA Resolution & Phenomenal Video
- 700 Lumens • Aggressively Priced

Religious Organizations and Churches — This is What You're Looking For



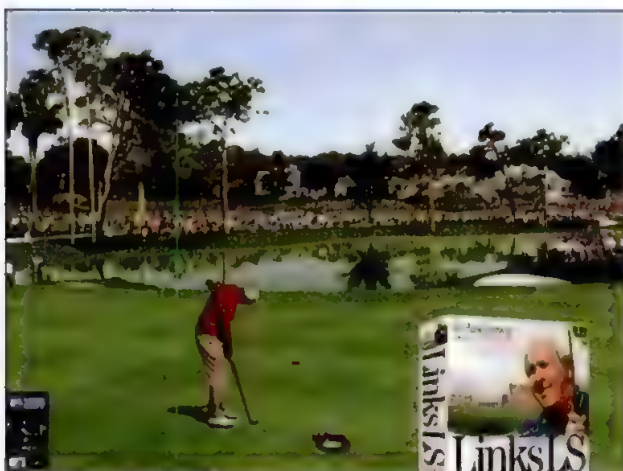
ADTECH
Empower your presentations

Ask ADTECH's Wizard about the right projector for you at



www.adtech-sys.com.

2D Marketplace



Actual screen capture: Bay Hill Club.

Links LS 1999 Edition—Where Technology Meets Tradition

The *New Links LS '99 Edition* features St Andrews Links Old Course, the birthplace of golf.

- Announcing the latest in the Links LS lineup—Links LS 1999 Edition. This NEW golf sim is packed with over 25 new and exciting features. Here are a few:
- St Andrews Links Old Course, Bay Hill Club & Lodge, Latitude 33, and Entrada at Snow Canyon
- Now with 4 swing options
- NEW Tournament Mode — play in front of live galleries
- NEW 3D objects for more realistic play
- NEW real-time voice chat over the Internet
- NEW mode to play "MOP" game designer
- NEW special tv shots
- NEW caddy book
- NEW enhanced graphics

ACCESS
SOFTWARE INCORPORATED

1-800-800-1880 www.AccessSoftware.com

DOS • WINDOWS • 95 • NT • OS/2 • UNIX



Corporate/East Coast Sales

Chi Corporation

30275 Bainbridge Rd., Suite 2A

Salem, OH 44139 • 800-828-0595

(440) 349-8605 • Fax: (440) 349-8609

Southeast Sales—Chi Corporation

4007 Dream Catcher Dr.

Woodstock, GA 30189

(770) 517-0636 • 800-564-3834

West Coast Sales—Chi Corporation

10840 North 28th Dr., Bldg. C205 Suite 21

Phoenix, AZ 85029

(602) 548-9010 • 800-828-0595

Data Interchange & Storage Experts

Nine Track Tape Systems

All Densities—800/1600/3200/6250

All Platforms

3480/3490/3490E/3590

compatible

Single Load or 10 or 60 cartridge Libraries

AIT—DLT—4mm—8mm

Complete Network backup

Solutions—Novell, NT, Unix

Libraries by ADIC & Overland Data

Data Conversion Services

4mm, 8mm, 9trk, 3480, 3490, 3490E, EVEN TO CD

CD ROM Recorders

2x/6x, 4x/6x—All platforms

Media Form CD duplication systems

CD ROM Jukeboxes

NSM, SONY, JVC, Pioneer, Cygnus

CHI 1635

35 CD capacity with 7—16x CD ROM Readers

Chi Corporation: Manufacturers of the Award Winning OutRight and ReelView II Software

Overland Data DLT Tape Libraries

Great capacity at lower cost

LXS



With native capacities from 300 GB to 525 GB, The LXS MiniLibrary delivers a cost-effective solution for workgroup-to-enterprise data storage.

The LXS accommodates one DLT 4000 or 7000 tape drive and 15 DLT tape cartridges.

www.chi corporation.com



Self-Paced Training for Windows Software

What Do You Need To Learn Today?™

Microsoft Certified
Solution Provider



Dan Balter
Microsoft MCSE &
Windows NT Instructor

Windows NT 4.0

Server Admin. Lev 1	\$89.95
Server Admin. Lev 2	\$89.95
Entp. Admin. Lev 1	\$89.95
Entp. Admin. Lev 2	\$89.95
Serv. & Wk. Install	\$89.95
Workstn. Admin. Lev 1	\$89.95
Workstn. Admin. Lev 2	\$89.95
Workstn. Admin. Lev 3	\$89.95
Adv. Lev. 1/2/3 (ea)	\$89.95
NT Resource Kit	\$89.95
Workstn. User Level 1	\$49.95
Workstn. User Level 2	\$49.95
Special All Fourings	\$89.95



Available in hard copy or video format.



Dennis Taylor
Microsoft Certified
& Excel Instructor

Excel 97

Beginning	\$49.95
Intermediate	\$49.95
Advanced	\$49.95
Power Features	\$49.95
Pivot Tables	\$49.95
Shortcuts & Ideas	\$49.95
Special All Six	\$239.95

Ask About MOUS

Windows 98

Beginning	\$49.95
Intermediate	\$49.95
Advanced	\$49.95
Internet Features	\$49.95
Installation	\$49.95
Plus	\$49.95
Active Desktop	\$49.95
Special All Four	\$149.95
Special All Seven	\$279.95

Special All Seven \$279.95



Dawn Bjork
Microsoft Certified
& Word Instructor

Word 97

Beg/Int/Adv (ea)	\$49.95
Special All Three	\$149.95
OTP Mail Merge (ea)	\$49.95
Tables & Forms	\$49.95
Internet	\$49.95
Special All Seven	\$279.95
Ask About MOUS	

Ask About MOUS

Access 97

Beg/Int/Adv (ea)	\$49.95
Special All Three	\$149.95
Developer Lev. 1-6 (ea)	\$89.95
Special All Nine	\$649.95
Free Book & CD w/Dev. set	



Domestic Shipping 7.5 Days \$5.00 for the first two videos (post \$1.50 for each additional video tape).



Alison Balter
Microsoft Certified Developer
& Access Instructor

Project 98

Level 1/2/3 (ea)	\$89.95
Level 4/5 (ea)	\$89.95
Special All Five	\$379.95

Ask About MOUS

Office 97

Act 4.0	
Gold Mine	
Visual Basic 5.0	
Visual C++ 5.0	
SQL Server 6.5	
Outlook 98	



Domestic Shipping 7.5 Days \$5.00 for the first two videos (post \$1.50 for each additional video tape).

Domestic Shipping 7.5 Days \$5.00 for the first two videos (post \$1.50 for each additional video tape).

Special MS Office 97 Video Combinations

MS Office 97 Plus (16 videos/32 hours)	\$579.95 (with KeyNotes \$749.95)
MS Office 97 Pro (13 videos/26 hours)	\$495.95 (with KeyNotes \$639.95)
MS Office 97 Standard (9 videos/18 hours)	\$349.95 (with KeyNotes \$469.95)

Special Lotus SmartSuite 97 Video Combinations

Lotus SmartSuite 97 Plus (16 videos/32 hours)	\$679.95
Lotus SmartSuite 97 Pro (13 videos/26 hours)	\$495.95
Lotus SmartSuite 97 Standard (9 videos/18 hours)	\$349.95

Special MCSE Certification Training

MCSE Plus Internet (20 videos/40 hours/Exam Simulations)	\$1,199.95
MCSE Certification Pro (29 videos/58 hours)	\$1,199.95
MCSE Certification Plus (20 videos/40 hours/Exam Simulations)	\$1,199.95

4 Easy Ways to Order

CALL	1-800-775-5925
FAX	1-801-373-6872
WEB	www.klscorp.com/pcm
MAIL	KeyStone Learning Systems Corp. 2241 Larsen Parkway • Provo, UT 84606

ADM PM128

2D Marketplace

Want A Raise? Want A Better Job? Then Get One of These.



There are over 340,000 open I.T. positions just waiting to be filled by somebody like you! All you need are the credentials.

When you become a certified I.T. (Information Technology) professional, you get what you really want from a job... a higher salary, more respect and increased skills.

Important

Most of our CBT courses are codeveloped with I.T. industry leaders like Microsoft, Novell and Cisco. This ensures that you'll receive current information to fully prepare you for passing the certification exams and utilizing your skills in the workplace.



FOREFRONT
DIRECT
A CBT Group Company

25400 US Hwy. 19 N., #285, Clearwater, FL 33763
1-800-653-4933 (813) 724-8994 Fax: (813) 726-6922

Copyright © 1998 CBT Group, PLC. All rights reserved. Forefront Direct, the Forefront Direct logo and Forefront Direct Self-Study Course are trademarks of CBT Group, PLC. All other trademarks are the properties of their respective holders. Printed in the U.S.A.

PM

Powerful Training at Your Convenience:

- MCSE
- Novell CIP
- Networking
- MCSO
- C++
- MCSE+Internet
- CNA
- Web Master
- Visual Basic
- COBOL
- MCP
- Cisco
- A+ Certification
- Visual C++
- Office 97
- CNE
- UNIX
- PC Repair
- Java
- And More!

SPECIAL OFFER:

For a limited time, receive one month of Training Consulting (\$300 Value) FREE!

Call Today for Your FREE Course Catalog
1-800-475-5831

• Realistic Interactive Exercises • Self-Paced Format • Easy, Convenient • Classroom Quality Training • Individual Consulting • Affordably Priced

Incredibly HOT OFFER

A \$50 VALUE FOR FREE*

Fire up your browser and go to: www.viagrafix.com/freecd, call us, or visit us at COMDEX to get your FREE ViaGrafix training CD containing six of the hottest software training titles. Once you are registered, ViaGrafix will give you an access code to unlock any one of the six titles on this CD for FREE! But hurry! This FREE offer is valid for quantities on hand, in stock on our Web site today, and for one of the first 100,000 people to use their FREE ViaGrafix training CD. Choose one of the following

Introductory titles:

- LEARNING WORD 97 • LEARNING EXCEL 97 • LEARNING PHOTOSHOP 5
- LEARNING WINDOWS 98 • PROGRAMMING HTML 4—VOLUME 1
- WINDOWS NT 4—VOLUME 1

*plus \$4.95 shipping and handling. Limit one CD-ROM per person.



QUANTITIES LIMITED!

TO GET YOUR FREE CD, CALL, WRITE, OR VISIT OUR
WEB SITE TODAY!

www.viagrafix.com/freecd

800/842-4723

tel: 918/825-6700 fax: 918/825-6744 or 800/842-3294 email: sales@viagrafix.com

One American Way, Pryor, OK 74361

NASDAQ:VIAX

COMDEX
Fall '98

COME SEE US AT COMDEX...VISIT
BOOTHS S8100, L2938, AND S4413
TO GET YOUR FREE CD!

©1998 ViaGrafix. Prices subject to change without notice.

H-1814-S

Design and Print Your Own Checks!



Mips VersaCheck™ Personal



- Includes security check paper for 150 checks
- Prints deposit slips and registers
- Compatible with Inkjet and laser printers
- Compatible with MS Money, Quicken, QuickBooks & more!

ERP \$19.99

Also available: VersaCheck for MS Word ERP \$29.99 VersaCheck PRO ERP \$79.99

MIPS **OfficeMax** **Staples** **Fry's** **Office Depot** **CompUSA**

Dataline America, Inc. Tel. 619-679-4070 • Fax 619-679-4073 **www.mipsdla.com**

ZD Marketplace

A+ INTERACTIVE CERTIFICATION COURSE



PASS THE FIRST TIME!

\$249

- STUDY AT YOUR OWN PACE
- 500+ SIMULATED PRACTICE TEST QUESTIONS
- EVERYTHING YOU NEED TO PASS BOTH EXAMS
- SAVE HUNDREDS OVER CLASSROOM TRAINING
- 1 YEAR FREE ONLINE SUPPORT
- UNCONDITIONAL MONEY BACK GUARANTEE
- DESIGNED FOR THE NEW AUGUST 1998 EXAMS

MICRO TECH USA
5501 ROMBEVELT BLVD.
727-437-0000 (N.E.)
727-437-1830 FAX

WWW.MITCUSA.COM

800-501-0510



ZD Marketplace

Computer Checks

For Laser/Inkjet Printers

- FAST turn-around time
- FAST, low-cost shipping
- Compatible with Quicken®, QuickBooks®, MS Money® and many more
- Your logo imprinted FREE
- Ask for a free catalog

LOWEST PRICE
IN THE COUNTRY
GUARANTEED!

Prices starting
at \$10.95!

Now Celebrating Our 25th Year!

<http://www.checksforless.com>

Call: 1-800-325-5568 Fax: 1-800-893-0177

Email: fsystem1@maine.rr.com



FormSystems

72 Auburn Street, Portland, Maine 04103-2170

ZD Marketplace

SoftCenter

America's Software Shop.
thebestplacetobuy.com

- Adobe PageMaker 6.5 full version retail box \$345
- Adobe Photoshop 5.0 Academic full version retail box \$349
- Corel WordPerfect Suite 8.0 w/ Dragon Naturally Speaking \$149
- NEW! Lotus SmartSuite Millennium Full Version OEM \$89
- MS BackOffice Small Business Server 25 User \$1429
- NEW! Home Essentials 98: Word 97, Encarta 98, Works 4.8 & more! \$129
- MS Office Pro Full Version Retail Box \$345
- MS Office Pro 97 Single User License (Zipper Pack) \$249
- MS Project 98 full version retail box \$277
- NEW! Visual C++ Pro 6.0 or MS Visual Basic Pro 6.0 \$189
- MS Visual FoxPro 5.0 full version retail box \$269
- MS Windows 98 Full Version CD, License & Manual \$99
- MS Windows 98 Upgrade or Win 98 Single User License \$79
- MS Windows NT Workstation 4.0 CD, License & Manual \$159
- MS Windows NT Server with 10 Client Access License \$729
- MS Windows NT 4.0 20 Client Access License Pack \$369

Visit our web site for
dozens of other great
software bargains! We
offer live 100% secure
online ordering

thebestplacetobuy.com

SoftCenter
America's Software Shop

6701 South Thayer
Seattle, WA 98178
Fax Us Your Bid FREE!
(800) 752-2199

Hours: Monday-Saturday
6AM-10PM Pacific Time
RESELLERS: Visit oemsoftware.com

(800) 752-2199
Major Credit Cards, CODs & POs Accepted

ZD Marketplace

200MB storage 6Gigs transfer \$13.95! per month

- T-3 Backbone Connection
- Secure Server (SSL) Access
- 99.9% Uptime
- CGI Access & Own Directory
- POP 3 / E-mail Accounts
- Microsoft FrontPage Support
- Shopping Cart / E-commerce
- 24 hr Domain Registration
- 24 x 7 Network Monitoring
- Data & Power Backup
- 30 Day Money Back Guarantee
- No Minimum Contract
- Same Day Set-Up

HOSTWAY.COM 1.800.308.6845
sales@hostway.com

Gateway to Quality Webhosting

Microsoft
FrontPage 98

Dedicated Server Sale!!

The Most Advanced Internet Service Available

OLM — Light Years Ahead Of The Rest

\$18.95/month

FREE EXTRAS

WWW/board installed • Graphics Counter
Guestbook installed • Shopcart
Free for all links page installed

- True virtual domain
- <http://your-name.com/>
- Access to our SSL
- Full POP mailbox
- 200 Email aliases
- Unlimited Infobots
- Full T3 Connection
- 3 Gigs of monthly transfer
- 150 megs of space
- Anonymous FTP site
- Weekly usage stats
- Your own cgi-bin full of scripts
- Front page supported
- Realaudio • HTML script
bonus for signing up online - code 226

Visit us for same day setup—www.olm.net
Contact us sales@olm.net or 800-741-6813

ZD Marketplace

"QUICKSWIPE ELECTRONIC TIME CLOCK"

Time & Attendance & Employee Scheduling

•999 INCLUDES

- HOURTRACK 98 (20 Employee Version)
- 25 Bar-Code Badges
- 50' RS-232 Cable
- Instructional Video



V.I.T.R.I.X.

1 800-561-6366
<http://www.vitrix.com>



"An Impressive
Time and Attendance System"
"Ideal for the Human
Resources Professional"

Diamonds for your beloved, and a 1,000 Megabyte fiber-optic backbone T-3 connection for YOU

- Local fiber-optic backbone with transfer of 1,000 Megabytes per second
- Unshared, dedicated 45 Megabyte per second clear-channel T-3 from UUNET
- Registered Microsoft FrontPage 98 Internet Presence Provider
- Two years in business
- FTP and Microsoft FrontPage 98 enabled
- Daily Tape Backup
- 24 hour free tech support English/German
- 99 percent uptime money back guarantee
- Microsoft Electronic Commerce Server 2.0
- Microsoft SQL 6.5 Database Connectivity
- Powered by Quaduple Pentium Pros 200 and Dual Pentium 400 MHz SCSI Ultrawide Server Farm
- Remote Website Management Module (Create your own cgi directories)
- Statistics Remote Management Module
- POP3 accounts: 1 account per dollar spent per month

Prices (subject to change):

Aworldwidemall.com Inc.

Windows NT Based Hosting

For more information or for easy online sign-up visit or call 24 hours per day, 7 days a week (website now available in Spanish):

<http://www.awwm.com/>

1(800)579-0723 • 1(888)677-2996

International: (001)703.370-3914 • email: lightningspeed@awwm.com

host.awwm.com/yourname

\$20 Setup Fee +

5MB	\$2.50	per month
10MB	\$4.50	per month
20MB	\$5.95	per month
50MB	\$8.95	per month
100MB	\$13.95	per month
150 MB	\$17.95	per month
500 MB	\$39.00	per month
1000MB	\$69.00	per month

www.yourname.com

\$24.95 Setup Fee +

5MB	\$5.00	per month
10MB	\$6.00	per month
20MB	\$7.00	per month
50MB	\$9.95	per month
100MB	\$14.95	per month
150 MB	\$18.95	per month
500 MB	\$40.00	per month
1000MB	\$80.00	per month

Dedicated Server Hosting: Windows NT or UNIX 2 x Pentium 400 MHz, 1/2 Gig Ram, SCSI Ultrawide III 4.5 Gigs, \$995 per month



ZD Marketplace

Full-Service Web Hosting Made Easy!

You deserve it!

TopChoice Systems

consistently exceeds our clients' expectations with our exceptional service, value and reliability.

We know what you and your web site deserve and that's what we give you!

Every account includes:

All for
\$24.95
month

- 150MB of Storage Space
- 25 POP Email Accounts & Unlimited Aliases
- Free Secure Server Access
- Unlimited Hits/Transfers
- Full T3 Connection to the Internet/Redundant Backups
- Free Registration in up to 650 Search Engines
- Microsoft FrontPage98 Extensions
- Personal CGI-Bin & Access to "Canned" Scripts (Perl, C, Shell)
- High Performance Web Servers
- Quick Account Activation
- Great Reseller Program
- No Hidden Charges
- 30-day Money Back Guarantee



Working hard for YOU!

Check Us Out Today!
<http://world.topchoice.com>
email: info@topchoice.com
Toll Free 1-888-219-2111

WE DO NOT HOST ADULT SITES.

ZD Marketplace

WITH 9NETAVENUE YOU'LL FEEL LIKE YOU'RE ON EASY STREET WEB SITE HOSTING FROM '14.95 NT OR UNIX



9NETAVE STANDARD Features

- Multiple OC-3's to UUNET, MCI & GTE Int'l
- Powered by SGI origin 2000 server
- Your own FTP site • Your own CGI directory
- 7500 Series Cisco Router • POP3 accounts
- Account "Control Panel" access via WWW
- Daily Tape Backup of your data
- Expert technical support • On-site UPS
- 24-hour on-site monitoring
- Same day set-up
- No minimum contract
- 99% uptime & 90 day money-back guarantee
- Toll free multilingual tech-support

Reserve Your Domain FREE

9NETAVE ONE Plan \$14.95/mo.

- 25MB • 10 mailboxes

9NETAVE PRO Plan \$39.95/mo.

- 100 MB of disc space • 25 POP3 mailboxes
- Unlimited Domains with unique IP addresses (www.yourcustomer.com)
- That's a reseller program with 100% discount

10 POP3 E-mail Accounts
\$7.95/mo.

DEDICATED SERVER from \$99
including hardware

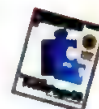
WELCOME TO EASY STREET



9NETAVENUE

1-888-9NETAVE 1-201-933-0765 1-888-260-7890

WWW.9NETAVE.NET



in CANADA

ZD Marketplace

Everyone hosts @ Hiway.

**\$15.95 for
ExpresSite™**

**Full features
from \$24.95**

**E-Commerce
from \$34.95**

There are as many reasons to have a Web site as there are Web sites. But there are some things everyone wants.

"I want it to be easy." With Hiway™ you can order online now, and be up and running right away.

"I want it to be fast." Hiway uses the fastest equipment available.

"I want it to be reliable." Hiway guarantees 99.9% reliability. We employ redundant servers, uninterruptible power, and 24x7 technical support.

"I want it to be affordable." At just \$15.95 per month, Hiway's new ExpresSite service puts a Web site within reach of everyone.

With a full range of hosting plans, and the most extensive feature set in the industry, there's a reason for everyone to host at Hiway. **Order online at www.hiway.com**

Features

- ✓ 30 day money-back guarantee
- ✓ Six T3 lines to diverse backbones
- ✓ 99.9% uptime—guaranteed!
- ✓ Windows® NT hosting available
- ✓ 24x7 multilingual support
- ✓ Email included at no extra cost
- ✓ Accounts set up in a few hours
- ✓ Domains registered within hours
- ✓ One month free with 6-month contract for Plan 1 and above

Hiway hosts over 100,000 customers

just \$15.95 a month

Reseller Opportunities Available

(6-month contract plus one-time setup fee.)



**Hiway
Technologies®**

THE WORLDWIDE LEADER IN WEB HOSTING

(800) 339-HWAY www.hiway.com (561) 989-8574

© 1998 Hiway Technologies, Inc. Hiway Technologies and the Hiway Technologies logo are registered trademarks and Hiway and ExpresSite are trademarks of Hiway Technologies, Inc. All other trademarks are of their respective holders.



The world
leader in
FrontPage®
hosting

ZD Marketplace

GET IT UP!



Keep it up with Sysnet Internet's
Guaranteed Uptime web hosting

99% Uptime Guarantee
OC-3 155Mbps speed
Full-time UPS and daily tape backup
Fully redundant connections
Same-day setup
www.yourdomain.com
100MB web space

Your own CGI-BIN
Server Side Includes
Unlimited FTP
Unlimited email
Unlimited data transfer
Graphical access statistics
Unix and NT Frontpage98

\$15.95

800.SYSNET.1 www.sysnet.net/uptime

WARNING: Your site may never go down.

ZD Marketplace

25 Effortless eCommerce

Any Site Can Accept Credit Cards Instantly!
Maximize Sales! Minimize Losses!

**FREE
EZCard**
shopping cart



Automate
your Site for
Sales!

Real-Time Secure Approvals From Your Site
Master Card Business For Non-Internet Sales
Password Restrict & Manage Your Members
Automate Your Periodic Subscription Billing
FraudTrak™ Layered Chargeback Protection
Securely Deliver Your Downloadable Files
Discounted Internet Merchant Accounts
No Technical Experience Required!

www.PlugnPay.com

CyberCash
Enabled
Platinum Partner

Secure Transaction Technologies - Call (866) 855-5812

ZD Marketplace

G/T INTERNET



www.gtinternet.com

Tel: 1-888-570-9331

your-name.com
300mb Disk Space
3 gigs Monthly Transfer
FrontPage Supported
SSL Free With All Accounts
Anonymous FTP Site
Cgi-Bin Full of Scripts
Full T3 Connection
WWWboard Installed
Guestbook & Shopcart

Website Hosting & Design

Your own FTP site. Full CGI, Perl, Java, HTML Scripting, Control Panel Access. CGI Library. E-Commerce Design. Setup. SQL. Maintenance. Weekly Usage Stats. Same Day Setup. Toll Free Support! Resellers. Real Audio/Video. Unix/NT. 99.9% Uptime

Basic

\$16.60

Complete

\$34.95

3 Months Free!

Is your name safe?
Secure your name
today! \$29

Premium Hosting & Design
Catalogs • Special Projects
Online Brochures • Value Added

ZD Marketplace

iNNErHOST

Experts.

Dedicated to Windows NT Web Hosting!

Windows NT has an extended degree of expandability and adaptability in regards to important website components.

Active Server Pages • ASP Components • MS Access
MS SQL • MS FrontPage • Visual InterDev • Secure Server
Live Stats • 24/7 Server Monitoring • On Site Technicians



100% Satisfaction
99.9% Uptime



1.888.751.5273 www.innerhost.com

ZD Marketplace

WEB HOSTING PLANS START AT \$19⁹⁵

Expect More. Get More.

"Netcom really knows
web hosting."

Netcom

We put the Net to work for you.

Netcom gives you more of what you need —
more storage, more transfer, more E-mail.

Netcom knows what you need to create an effective web site — fast and hassle-free. We host tens of thousands of sites from one-person businesses to E-commerce powerhouses. Our features lead the industry. They include reliable high-speed connections, 24x7 toll-free support, and the tools to get your site up and running in as little as 30 minutes.

So when you need the best value in web hosting services, **get Netcom, and get more.**

CALL 1-888-758-2962

Mention Promotion Code H23642

www.hosting.netcom.com/pcmag

© 1998 NETCOM On-Line Communication Services, Inc. an ICG Communications, Inc. company

ZD Marketplace

The driving force behind DIRT Motorsports is burn-rubber, haul-ass, wet-dust speed. And we're just talking about their web page.

load Home Search Guide Images Print Stop

v.dirtmotorsports.com/

The editor was 31 Jul 1998 and made changes:

- [Press Release](#)
- [Modified Roster](#)
- [350 Modified Roster](#)
- [Driver Frequencies](#)
- [Weekly Race Results](#)

interland
Web Hosting

Speed. Another Reason People Trust

Web Hosting From
\$19⁹⁵ Per Month
1-800-656-7582
404-535-0000

ZD Marketplace

PREMIER Shop ZD Marketplace. Go to <http://marketplace.computershopper.com>. Hundreds of ads, plus links to the Web sites of ZD Marketplace advertisers.

Lost in the Crowd?

**Shouldn't
Your
Web Site
Be a Priority?**

Priority Servers

10 sites or less on a Priority Server—Guaranteed!

Is your site one of hundreds on a server? Is that appropriate for your company? You want the performance and flexibility of a dedicated server without the expense—and a company that recognizes the importance of your business. With A Reiter Associates' Priority Server we guarantee you state of the art servers, reliability, speed, and 24/7 monitoring with the personal attention your business deserves.

189.95/Mo

WWW.REITERASSOC.COM

REITER ASSOCIATES WEB HOSTING • 1.800.203.5767 • SALES@REITERASSOC.COM



Standard 19.95

50 MB's Disk Space
2500 Mb's Data Transfer

Enhanced 44.95

100 MB's Disk Space
3500 Mb's Data Transfer
Shopping Cart
ODBC Data Base Connectivity

Commerce 74.95

150 MB's Disk Space
10,000 Mb's Data Transfer
Real Time Credit Card Trans.
Shopping Cart
ODBC Data Base Connectivity

All Plans Include:

- FrontPage support
- Statistics Reporting
- E-mail Accounts
- Autoreponders
- CGI-BIN
- SSL
- Real Audio/Video
- 24/7 Monitoring

STOP LOSING SALES TODAY!

**Process secured
credit card transactions
over the Internet!**

Harbor Consultants provides the ability to process automated secured transactions in REAL TIME over the Internet. Ask us about ACH checks feature—the ability to transfer funds from customer's checking account directly to the merchant's bank account, thus replacing the need to accept checks. We also offer transaction processing solutions for storefront, mail/telephone order, service and home-based businesses.



1-800-728-4445

Merchant accounts provided through First American Pay Systems, a registered agent of First Nations Bank in Brookings, Brookings, SD. *Discover Card and American Express subject to separate approval.

ZD Marketplace

Get Free Software For:

Windows NT PalmPilot / Palm OS
Windows 95/98 Games for Windows NT
Windows CE IBM OS/2 Warp

WAREWORLD

Your Gateway to Software on the Internet

<http://www.WareWorld.com>

ZD Marketplace

WIN PROXY

PROXY/MAIL SERVER FOR WINDOWS NT/95

- Connect your LAN to the Internet with 1 modem!
- Just one phone line and one provider account
- Increase the throughput and lower your connection fees!
- Safeguard your data with the firewall
- Transfer all your e-mail with the built-in mail server
- Free support by e-mail
- Free 20 day testing



**THE BEST OF
LANTIMES**

received from the Lantimes Testing Center
Apr. 13 issue, Pg.32

ORDER ONLINE! www.winproxy.net

ZD Marketplace

"This is a new concept
in doing
business
online..."



COMMERCE HOSTING \$49.95 PER MO.

- 5GB of data transfer per month
- 100MB of disk space
- Redundant T3 connections to the Internet
- Peering arrangements at MAE East, MAE West, Chicago, and Texas
- High speed, multiprocessor servers
- MIVA* shopping cart system included
- CyberCash* support
- SQL Database with ODBC support
- Real Audio*
- Merchant services available
- Virtual domain <http://www.yourdomain.com>
- Advanced control panel
- Remote e-mail administration tools
- Virtual FTP server <http://ftp.yourdomain.com>
- WebTrends site statistics

Hosting plans from \$19.95 a month!

actually
doing business
online."

Now that your company has established its online presence, isn't it time you realized a return on that investment? Our Commerce Hosting plan offers everything you need to do business on the Web, all for under \$50 a month: loads of disk space, unlimited data transfer, shopping carts, CyberCash™ support, and much more. Visit www.valueweb.net today or call 1 800 WE HOST U.

ValueWeb

Sign-up online at www.valueweb.net VARs/Resellers: www.valueweb.net/reseller



CARDSERVICE.



Trade Online

Signal, the Real-Time Money Making Machine

- Stocks
- Futures
- Options
- Forex
- News
- Charting
- Free Software
- Historical Data
- FREE NASDAQ Level II
- Pager/Cell Phone Alerts
- Streaming Internet Delivery



Call today
and make more
money tomorrow.

30 Day Trial!

**Signal
Online**

www.dbc.com/pcmag

2D Marketplace

Shouldn't Service
be Your Concern?

NT Hosting plans start from

\$14.95
/month*

*Does not include
set-up fee and
internet domain
registration fees

SiteHosting.net

Affordable Excellence in Service

<http://sitehosting.net>

Toll free: (888)463-6188

E-mail: info@sitehosting.net

A Division of Dynatex Infoworld, Inc.

- Redundant T3 Backbone Connection
- SSL Secure Server Access
- FrontPage 98 Support
- RealAudio/RealVideo
- Active Server Pages
- eShare Chat Server
- Cold Fusion 3.1
- Shopping Cart
- E-Commerce

2D Marketplace

Reach for the
Summit
in Hosting

Hosting Plans From **\$14.95**
per month!

Standard Plan:

- 60MB of Storage
- 2500MB of Transfer
- 10 POP3 Email Accounts
- Email Forwarding
- Auto Responders
- MS FrontPage Extensions
- CGI-BIN
- Secure Server
- Same Day Setup
- 24 Hour Technical Support
- 30 Day Money Back Guarantee

1-800-896-1433

<http://www.summithosting.com>

SUMMIT HOSTING

2D Marketplace

CLASSIFIED

Shop ZD Marketplace. Go to <http://marketplace.computer shopper.com>. Hundreds of ads, plus links to the Web sites of ZD Marketplace advertisers.**Save 50%**Printer / Fax / Copier
Cartridges ForApple
Brother
Canon
Epson
Hewlett Packard
I.B.M. / Lexmark
N.E.C.
Okidata
Sharp
XeroxHighest Quality
Longer Lasting
100% Guaranteed
Free Shipping**National Toner**
203-853-2998**800-676-0749**WWW.NATIONALTONER.COM**TONER****OF THE LAPTOPS****Boston Millennium
COMPUTER LAPTOPS****128 MB and Higher
24 CD-ROM
5.2 GB Pentium II
266MHz**Win 95
upgrade
\$90**IBM Think Pad**
Uncompromising Power
& Performance for Top PerformancesWeights only
4.1 lbsWe accept Growth Dollars (a Discount Coupon)
for every \$20 of Think Pad 560www.innovativepatent.com

other peripherals available!

Call **800-204-2589**

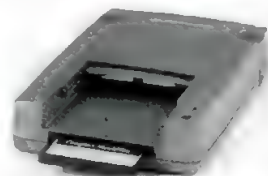
Sales/Technical Support 718-745-5259

Lowest Price for Highest Technology

INNOVATION INDUSTRIES

George Lammies

469 80 St., 5th Ave • Brooklyn NY 11209

**Mouse
Pads**Custom
Printed
• Your Logo
Design• Fast
Turnaround• Guaranteed
Quality**MicroStore™**
800-962-8885FAX: 507-
665-2604LE SUEUR,
MIN 56058**Wrist
Supports****Introducing CameraMate™**A CompactFlash Reader/Writer
for under \$100!This parallel port reader features a printer pass
through connection, a separate Type III PC Card
slot, and full Windows 95 compatibility. Call for
info on this and other digital photo solutions,
including SCSI and ISA readers and a wide range
of PC Card media.**MICROTECH**242 Branford Road, N. Branford, CT 06471-1303
800-570-9540 • www.microtechint.com

ZD Marketplace

BASON ComputersMon-Fri 7:30-7:30
Sat 9:00-5:00**800-238-4453****3.5" Hard Drives**

540MB	Quantum 540A	IDE	\$89
640MB	Quantum 640AT	IDE	\$95
840MB	Seagate 3851A	IDE	\$105
1.0GB	Seagate 31220A	IDE	\$105
1.2GB	Quantum 31280A	IDE	\$105
1.2GB	Quantum 31280S	SCSI	\$165
1.2GB	Seagate 31275A	IDE	\$99
1.6GB	Quantum 31620A	IDE	\$105
2.0GB	Fujitsu 2952S	USCSI	\$185
2.0GB	Seagate 32122A	IDE	\$119
2.0GB	Seagate 32272N	SCSI	\$269
2.0GB	Seagate 32171N	USCSI	\$239
2.0GB	Seagate 32151N	SCSI	\$229
2.5GB	Quantum 32550A	IDE	\$119
2.5GB	Seagate 32531A	IDE	\$119
2.0GB	Seagate 32323A	IDE	\$129
4.0GB	Fujitsu 2954S	USCSI	\$279
4.0GB	Quantum XP34550S	USCSI	\$279
4.0GB	Seagate 34301S	SCSI	\$279
4.0GB	Seagate 35150N	SCSI	\$249
4.0GB	Seagate 34371N	USCSI	\$349
4.0GB	Seagate 34501N	USCSI	\$429
5.0GB	Martor 8512006	IDE	\$149
5.0GB	Quantum 36480A	IDE	\$159

3.5" Hard Drives

6.0GB	Seagate 36540A	IDE	\$169
8.7GB	Martor 9084006	IDE	\$209
8.7GB	Quantum 36450S	USCSI	\$429
8.7GB	Seagate 3641A	IDE	\$199
9.0GB	Fujitsu 29495YU	USCSI	\$479
9.0GB	IBM DGHS-39100S	USCSI	\$329
9.0GB	IBM DORS-39130S	USCSI	\$339
9.0GB	Quantum 39100S	USCSI	\$549
9.0GB	Seagate 19101N	USCSI	\$679
9.0GB	Seagate 19171N	USCSI	\$599
9.0GB	Seagate 39140A	IDE	\$279
13GB	Martor 913600	IDE	\$319
16GB	IBM DTTA-351680	USCSI	\$429
18GB	IBM DGHS-950	USCSI	\$1099
18GB	Seagate 118273N	USCSI	\$1099
23GB	Seagate 423451N	SCSI	\$1199

Tape Drives

2.0GB	Conner 4324	\$379
4.0GB	Conner 4326	\$399
8.0GB	HP 1533	\$799
8.0GB	Conner 8000	\$499
10.0GB	Quantum DLT2000	\$1399
16.0GB	Conner 4584	\$999
40.0GB	Quantum DLT4000	\$1699

Wide SCSI Drives

1.0GB	Seagate 3105SW	\$149
1.0GB	IBM DGAS-UW	\$189
2.0GB	Seagate 3215SW	\$199
2.0GB	Seagate 3215SW-UW	\$219
4.0GB	Fujitsu 2954QAU	\$299
4.0GB	IBM DGAS-UW	\$249
4.0GB	Quantum 3430W-U	\$289
4.0GB	Seagate 15180W	\$249
9.0GB	Fujitsu 30015P-UW	\$629
9.0GB	Seagate 31080W	\$429
9.0GB	Seagate 31171-UW	\$629
9.0GB	Seagate 31101-UW	\$679
18GB	Seagate 118273-UW	\$999
23GB	Seagate 423451W	\$1199

Hot-Swap DrivesPlease call for 80-Pin
wide & regular drives
(Range from 1.0GB to 18.0GB)**Notebook Drives**

720MB	IBM DD0A-2720	\$109
810MB	Toshiba MK1326PCV	\$129
1.3GB	Toshiba 1302MAV	\$135
1.4GB	Toshiba 1403MAV	\$150
2.1GB	Hitachi DK237A-21	\$180
2.1GB	Toshiba 2104MAV	\$180
3.2GB	Toshiba 3205MAV	\$220
3.2GB	Hitachi 226A32	\$200
3.2GB	Fujitsu MHD2032AT	\$290
4.0GB	IBM DKLA-23240	\$300
4.0GB	IBM DTCA-24090	\$300
4.0GB	Hitachi DK227A-1	\$300
4.0GB	Toshiba 4006MAV	\$279
5.0GB	Hitachi 227A-50	\$400
5.0GB	IBM DPLA-25120	\$400
5.0GB	IBM DADA-25400	\$509
6.0GB	Toshiba 6409MAV	\$509
6.0GB	IBM DADA-26480	\$509
8.1GB	IBM DYLA-28100	\$659

• Pentium 233
MMX
• 256K Cache
• 32MB RAM
• Active-Matrix• Pentium III 266
• 128K Cache
• 32MB RAM
• 32X CD-ROM
• 56K Data/Fax
• 17" Flat-screen

ZD Marketplace

WHOLESALEPC Supply, your wholesale
computer parts resource, sells to
Corporate, Government, Educational,
PC and OEM resellers only.We offer all types of OEM and
Bulk computer parts, peripherals
and accessories such as
motherboards, CPU's, harddrives,
memory, video cards, networking,
multimedia, and software.

For more information, check out

www.pc-supply.com**888-873-PCPC****PC Supply****NOTEBOOK MEMORY**

Specializing in Memory with the MOST

COMPETITIVE PRICES

CALL

1-800-938-3010

VISIT OUR WEBSITE AT

WWW.MULTIMEDIAMEMORY.COM**Discount Memory**

Hours

Mon-Fri 7:30 AM - 5:30 PM PST

Sat 9 AM - 12 PM

Phone (714) 779-7676

Fax (714) 779-7673



*prices subject to change without notice

MEMORY

EDO	SD RAM	NON-PARTY (FPM)	TRUE PARTY (FPM)
2X32	\$7.25	2164 16MB	\$18
4X32	\$14.50	4X64 32MB	\$32
8X32	\$29	8X64 64MB	\$75
		16X64 128MB	\$148

CPU'S

INTEL PENTIUM II	INTEL PENTIUM	AMD	W. DIGITAL	MAXTOR
P11-266 \$92	P-133 \$70	K6-233 \$75	1.2 \$119	1.3 \$123
P11-300 \$209	P-200 \$180	K6-266 \$80	2.5 \$140	2.6 \$219
P11-333 \$219	P-266 \$69	K6-300 \$80	3.2 \$159	3.3 \$159
P11-350 \$339	P-166MMX \$90		4.0 CALL	
P11-400 \$495	P200MMX \$102		5.1 \$198	
	P-233MMX \$112			

CD-ROM'S

40X SPEED TOSHIBA	\$37	DIAMOND 3D MONSTER 12MB	\$180	US ROBOTICS 56K-V.30	\$68
56X SPEED MITSUBISHI	\$41	ATI 3D XPERT@PLAY 8MB	\$88	ZOLTRIX 56K-V.30	\$41
32X SPEED TEAC	\$39			ZOLTRIX 33.6	\$28

MOTHERBOARDS

INTEL 5E, 440BX	\$127	ALIVE 64 VALUE	\$49
SUPERMICRO P6-SBA	\$119	GENIUS YAMAHA	\$12
ASUS P11 LX	\$99	HARMONY ESS METRO 1 PCI	\$22
NTC P11 LX	\$59		

VIDEO CARDS**MODEMS**

CALL FOR NOTEBOOK MEMORY!

ZD Marketplace

Windows POS That's Affordable & Easy to Use

Solutions for 1 store with 1 register to 9,999 store with 999 registers
& Back Office Stations with 32 bit Windows platforms

MTI has helped over 20,000 retailers increase profits for the past 16 years

- Reduce Theft • Reduce Over/Under buying
- Inventory Control • Purchasing/Receiving
- Pricing Accuracy • Accounts Receivable
- Warehouse Management • Back Office Systems
- Data Import/Export • Point of Sale



Two Time Winner of the
Software Publishers Association
Star Search Award

We're also looking for the **BEST POS Dealers** in the USA
The Best of Everything Windows 3.1, Windows 95 & Windows NT, LAN, WAN, or BUS

Visit Our Web Site at **www.mtipos.com**

MTI

800-767-4367

301-948-8800 Fax 301-948-9125 e-mail: mtipos@mtipos.com

Micro Technology Industries, Inc.

200 Girard Street, #212 • Gaithersburg, MD 20877

Contact us for Our Reseller packages.
We have Resellers across the country

ZD Marketplace

Designed to be the BEST

For ease of use, superior technical support and the absolute best pricing for
BAR CODE SCANNING EQUIPMENT...

SEARCHING NO MORE

PLUG AND PLAY!!!

Wand/Decoder \$115 Intelligent Wand \$125 80mm CCD Scanner \$135
Symbol Laser Scanner \$299 2 Track Mag. Stripe Reader \$115

For More Information See Us at: **www.zebex.com**
e-mail: sales@zebex.com Resellers only

ZEBEX AMERICA, INC.

908-359-2070 Fax 908-359-1272

ZEBEX America West NewPort Beach, CA
714-474-9595 Fax 714-474-9550



HOLIDAY SPECIAL

Pentium II 300 Multimedia

Pentium II 300
64MB SDRAM
6.4GB hard drive
32X CD-ROM
8MB AGP video
56K Modem
ACS90 speakers
32-bit sound card
Floppy, kb, mouse
Windows 98



*Monitor extra
Call
1-800
535-5454

ViewSonic Monitors
15" #V55 \$189
17" #GS771 \$379
HP DJ 720c \$289
(600 dpi color printer)



Full 3 Years manufacturer warranty
Free Shipping, Call now for details!
Toll free ordering/customer service
All major credit cards accepted
state of the art technology at down to earth prices

M S Enterprises
225 Viscoloid Avenue
Leominster, MA 01453
www.msei.com

Ruggedized

Automobile & Airline

Power Adapters for laptops!

Apple PowerBook G3	-#AP2420Z
CTV FZBook series	-#CT2030W
Compaq Presario	-#CO1930W
Digital Ultra 2000	-#DI2420K
Dell Inspiron 7000	-#DE2035W
Fujitsu LifeBook series	-#FU1630Y
IBM ThinkPad series	-#IB1635P
Panasonic ToughBook	-#PA1540Y
Sony PCG series	-#SN2030Y
Sony Vaio S05 series	-#SN1625Y
Toshiba Tecra, Satellite	-#TO1540Y

Many more models available - see website

LIND LIND ELECTRONICS
MINNEAPOLIS, MN
Tel: #612-937-6303
Fax: #612-937-7740
Mon-Fri 9am-5pm CT

To order toll-free
800-897-8994

To order online 24 hrs./day
www.lindelectronics.com

BarCode Discount

Warehouse, Inc.

We will beat any advertised price!

1-800-888-2239

Call for a FREE Catalog!

LASER SCANNERS

\$255 Metrologic 951/47
Laser Scanner
MET951 \$255.00
MET951-14 \$265.00
MET951-47 \$265.00
PSC9510-11 \$265.00
SymaScan951 \$265.00

RECEIPT PRINTERS

\$229 STAR SP212C/FD
Receipt Printer
StarSP212C/FD \$229.00
StarSP212C \$229.00
StarSP212C-1 \$229.00
Epson TM300/PO \$229.00
Epson TM286 \$229.00
Epson TM286/PO \$229.00

CCD SCANNERS

\$155 Our Best Selling 3"
Decoded CCD Scanner
DM-CCD \$155.00
DM-CCD-R232 \$155.00
DM-CCD-D-MAC \$155.00
WA-CCD \$155.00
WA-CCD-R \$155.00

CASH DRAWERS • POLE DISPLAYS

\$179 Cash Drawers
EUF-100 \$179.00
EUF-100-1 \$179.00
EUF-100-2 \$179.00
Pole Displays
Logix \$179.00
Pole \$179.00
Pole \$179.00

9841 York Alpha Drive • Unit C • North Royalton, OH 44133 • Phone: 440-582-1144 • Fax: 440-582-1177
US and Canada Call Toll Free 1-800-888-2239 • E-mail: sales@bcdw.com • Website: www.bcdw.com

ZD Marketplace

CD COPIER



STARTING AT **\$1495**

Other Services include:

- Fast copies, CD or Disk Duplication in 24 hours
- Quality Bulk CD-Rs and Diskettes

PRINCETON DIS Service since 1986
800-426-0247
www.princetondiskette.com

ZD Marketplace

COMPUTER SUPPORT SYSTEM

We are a new innovative company in the computer industry, specializing in all makes & models of sales & services

IBM PS 2 Keyboard
IBM Terminal Keyboard 3151, 3153
IBM Laptop
Compaq Enhanced Keyboard
HP C3758-A Keyboard
NCR H0150-Standard One Keyboard
Gateway 2000
Digital Models LK201, 401 -AA
All Wyse Terminal Keyboard

FULL RANGE OF TECHNICAL SUPPORT SERVICE TO ALL SYSTEMS

If we can be of any service to your Organization,
Please contact CSS at the Following

Phone **201-217-1982**
Fax **201-217-4427**
email **kamin68466@aol.com**
2801 KENNEDY BLVD., STE. 46 • JERSEY CITY, NJ 07306

O.E.M. & COMPATIBLE

Laser Copier Inkjet Digital Toners Ink Masters

LASER CARTRIDGES for

HP 4/4 • Long Life	\$83.95
HP11/111 Long Life	\$35.99
HP 11Si/111Si Long Life	\$69.95
HP 5Si	\$139.94
HP 11/111P	\$55.75
HP 5L/6L	\$64.95

INKJET CARTRIDGES for

Apple SW2400 - Blk	\$5.50
Apple SW2400 - C	\$10.95
Canon BJ300 - Blk	\$6.50
Canon BJ600 - CMY	\$3.50
Canon BJ800 - Blk	\$9.00
Canon BJ800 - CMY	\$8.50
Canon BJ4000 - 3C	\$10.95
Epson 500 - Blk	\$9.95
Epson 500 - 3C	\$15.95
Epson 800/1520 - Blk	\$10.95
Epson 800/1520 - 3C	\$15.95
Epson 11/11S	\$8.25
Epson 11S - 3C	\$15.95

800-748-8806

DWIGHT COMPANY

25900 Greenfield, Ste. 248 • Oak Park, MI 48237
248-967-3315 • fax: 248-967-2254
e-mail: **DSmith1735@aol.com**

bar coding windows

bar code fonts \$149

2 types, Code 39, Bar Code, 1D, 2D, 3D, 4D, 5D, 6D, 7D, 8D, 9D, 10D, 11D, 12D, 13D, 14D, 15D, 16D, 17D, 18D, 19D, 20D, 21D, 22D, 23D, 24D, 25D, 26D, 27D, 28D, 29D, 30D, 31D, 32D, 33D, 34D, 35D, 36D, 37D, 38D, 39D, 40D, 41D, 42D, 43D, 44D, 45D, 46D, 47D, 48D, 49D, 50D, 51D, 52D, 53D, 54D, 55D, 56D, 57D, 58D, 59D, 60D, 61D, 62D, 63D, 64D, 65D, 66D, 67D, 68D, 69D, 70D, 71D, 72D, 73D, 74D, 75D, 76D, 77D, 78D, 79D, 80D, 81D, 82D, 83D, 84D, 85D, 86D, 87D, 88D, 89D, 90D, 91D, 92D, 93D, 94D, 95D, 96D, 97D, 98D, 99D, 100D, 101D, 102D, 103D, 104D, 105D, 106D, 107D, 108D, 109D, 110D, 111D, 112D, 113D, 114D, 115D, 116D, 117D, 118D, 119D, 120D, 121D, 122D, 123D, 124D, 125D, 126D, 127D, 128D, 129D, 130D, 131D, 132D, 133D, 134D, 135D, 136D, 137D, 138D, 139D, 140D, 141D, 142D, 143D, 144D, 145D, 146D, 147D, 148D, 149D, 150D, 151D, 152D, 153D, 154D, 155D, 156D, 157D, 158D, 159D, 160D, 161D, 162D, 163D, 164D, 165D, 166D, 167D, 168D, 169D, 170D, 171D, 172D, 173D, 174D, 175D, 176D, 177D, 178D, 179D, 180D, 181D, 182D, 183D, 184D, 185D, 186D, 187D, 188D, 189D, 190D, 191D, 192D, 193D, 194D, 195D, 196D, 197D, 198D, 199D, 200D, 201D, 202D, 203D, 204D, 205D, 206D, 207D, 208D, 209D, 210D, 211D, 212D, 213D, 214D, 215D, 216D, 217D, 218D, 219D, 220D, 221D, 222D, 223D, 224D, 225D, 226D, 227D, 228D, 229D, 230D, 231D, 232D, 233D, 234D, 235D, 236D, 237D, 238D, 239D, 240D, 241D, 242D, 243D, 244D, 245D, 246D, 247D, 248D, 249D, 250D, 251D, 252D, 253D, 254D, 255D, 256D, 257D, 258D, 259D, 260D, 261D, 262D, 263D, 264D, 265D, 266D, 267D, 268D, 269D, 270D, 271D, 272D, 273D, 274D, 275D, 276D, 277D, 278D, 279D, 280D, 281D, 282D, 283D, 284D, 285D, 286D, 287D, 288D, 289D, 290D, 291D, 292D, 293D, 294D, 295D, 296D, 297D, 298D, 299D, 300D, 301D, 302D, 303D, 304D, 305D, 306D, 307D, 308D, 309D, 310D, 311D, 312D, 313D, 314D, 315D, 316D, 317D, 318D, 319D, 320D, 321D, 322D, 323D, 324D, 325D, 326D, 327D, 328D, 329D, 330D, 331D, 332D, 333D, 334D, 335D, 336D, 337D, 338D, 339D, 340D, 341D, 342D, 343D, 344D, 345D, 346D, 347D, 348D, 349D, 350D, 351D, 352D, 353D, 354D, 355D, 356D, 357D, 358D, 359D, 360D, 361D, 362D, 363D, 364D, 365D, 366D, 367D, 368D, 369D, 370D, 371D, 372D, 373D, 374D, 375D, 376D, 377D, 378D, 379D, 380D, 381D, 382D, 383D, 384D, 385D, 386D, 387D, 388D, 389D, 390D, 391D, 392D, 393D, 394D, 395D, 396D, 397D, 398D, 399D, 400D, 401D, 402D, 403D, 404D, 405D, 406D, 407D, 408D, 409D, 410D, 411D, 412D, 413D, 414D, 415D, 416D, 417D, 418D, 419D, 420D, 421D, 422D, 423D, 424D, 425D, 426D, 427D, 428D, 429D, 430D, 431D, 432D, 433D, 434D, 435D, 436D, 437D, 438D, 439D, 440D, 441D, 442D, 443D, 444D, 445D, 446D, 447D, 448D, 449D, 450D, 451D, 452D, 453D, 454D, 455D, 456D, 457D, 458D, 459D, 460D, 461D, 462D, 463D, 464D, 465D, 466D, 467D, 468D, 469D, 470D, 471D, 472D, 473D, 474D, 475D, 476D, 477D, 478D, 479D, 480D, 481D, 482D, 483D, 484D, 485D, 486D, 487D, 488D, 489D, 490D, 491D, 492D, 493D, 494D, 495D, 496D, 497D, 498D, 499D, 500D, 501D, 502D, 503D, 504D, 505D, 506D, 507D, 508D, 509D, 510D, 511D, 512D, 513D, 514D, 515D, 516D, 517D, 518D, 519D, 520D, 521D, 522D, 523D, 524D, 525D, 526D, 527D, 528D, 529D, 530D, 531D, 532D, 533D, 534D, 535D, 536D, 537D, 538D, 539D, 540D, 541D, 542D, 543D, 544D, 545D, 546D, 547D, 548D, 549D, 550D, 551D, 552D, 553D, 554D, 555D, 556D, 557D, 558D, 559D, 560D, 561D, 562D, 563D, 564D, 565D, 566D, 567D, 568D, 569D, 570D, 571D, 572D, 573D, 574D, 575D, 576D, 577D, 578D, 579D, 580D, 581D, 582D, 583D, 584D, 585D, 586D, 587D, 588D, 589D, 590D, 591D, 592D, 593D, 594D, 595D, 596D, 597D, 598D, 599D, 600D, 601D, 602D, 603D, 604D, 605D, 606D, 607D, 608D, 609D, 610D, 611D, 612D, 613D, 614D, 615D, 616D, 617D, 618D, 619D, 620D, 621D, 622D, 623D, 624D, 625D, 626D, 627D, 628D, 629D, 630D, 631D, 632D, 633D, 634D, 635D, 636D, 637D, 638D, 639D, 640D, 641D, 642D, 643D, 644D, 645D, 646D, 647D, 648D, 649D, 650D, 651D, 652D, 653D, 654D, 655D, 656D, 657D, 658D, 659D, 660D, 661D, 662D, 663D, 664D, 665D, 666D, 667D, 668D, 669D, 670D, 671D, 672D, 673D, 674D, 675D, 676D, 677D, 678D, 679D, 680D, 681D, 682D, 683D, 684D, 685D, 686D, 687D, 688D, 689D, 690D, 691D, 692D, 693D, 694D, 695D, 696D, 697D, 698D, 699D, 700D, 701D, 702D, 703D, 704D, 705D, 706D, 707D, 708D, 709D, 710D, 711D, 712D, 713D, 714D, 715D, 716D, 717D, 718D, 719D, 720D, 721D, 722D, 723D, 724D, 725D, 726D, 727D, 728D, 729D, 730D, 731D, 732D, 733D, 734D, 735D, 736D, 737D, 738D, 739D, 740D, 741D, 742D, 743D, 744D, 745D, 746D, 747D, 748D, 749D, 750D, 751D, 752D, 753D, 754D, 755D, 756D, 757D, 758D, 759D, 760D, 761D, 762D, 763D, 764D, 765D, 766D, 767D, 768D, 769D, 770D, 771D, 772D, 773D, 774D, 775D, 776D, 777D, 778D, 779D, 780D, 781D, 782D, 783D, 784D, 785D, 786D, 787D, 788D, 789D, 790D, 791D, 792D, 793D, 794D, 795D, 796D, 797D, 798D, 799D, 800D, 801D, 802D, 803D, 804D, 805D, 806D, 807D, 808D, 809D, 810D, 811D, 812D, 813D, 814D, 815D, 816D, 817D, 818D, 819D, 820D, 821D, 822D, 823D, 824D, 825D, 826D, 827D, 828D, 829D, 830D, 831D, 832D, 833D, 834D, 835D, 836D, 837D, 838D, 839D, 840D, 841D, 842D, 843D, 844D, 845D, 846D, 847D, 848D, 849D, 850D, 851D, 852D, 853D, 854D, 855D, 856D, 857D, 858D, 859D, 860D, 861D, 862D, 863D, 864D, 865D, 866D, 867D, 868D, 869D, 870D, 871D, 872D, 873D, 874D, 875D, 876D, 877D, 878D, 879D, 880D, 881D, 882D, 883D, 884D, 885D, 886D, 887D, 888D, 889D, 890D, 891D, 892D, 893D, 894D, 895D, 896D, 897D, 898D, 899D, 900D, 901D, 902D, 903D, 904D, 905D, 906D, 907D, 908D, 909D, 910D, 911D, 912D, 913D, 914D, 915D, 916D, 917D, 918D, 919D, 920D, 921D, 922D, 923D, 924D, 925D, 926D, 927D, 928D, 929D, 930D, 931D, 932D, 933D, 934D, 935D, 936D, 937D, 938D, 939D, 940D, 941D, 942D, 943D, 944D, 945D, 946D, 947D, 948D, 949D, 950D, 951D, 952D, 953D, 954D, 955D, 956D, 957D, 958D, 959D, 960D, 961D, 962D, 963D, 964D, 965D, 966D, 967D, 968D, 969D, 970D, 971D, 972D, 973D, 974D, 975D, 976D, 977D, 978D, 979D, 980D, 981D, 982D, 983D, 984D, 985D, 986D, 987D, 988D, 989D, 990D, 991D, 992D, 993D, 994D, 995D, 996D, 997D, 998D, 999D, 1000D, 1001D, 1002D, 1003D, 1004D, 1005D, 1006D, 1007D, 1008D, 1009D, 1010D, 1011D, 1012D, 1013D, 1014D, 1015D, 1016D, 1017D, 1018D, 1019D, 1020D, 1021D, 1022D, 1023D, 1024D, 1025D, 1026D, 1027D, 1028D, 1029D, 1030D, 1031D, 1032D, 1033D, 1034D, 1035D, 1036D, 1037D, 1038D, 1039D, 1040D, 1041D, 1042D, 1043D, 1044D, 1045D, 1046D, 1047D, 1048D, 1049D, 1050D, 1051D, 1052D, 1053D, 1054D, 1055D, 1056D, 1057D, 1058D, 1059D, 1060D, 1061D, 1062D, 1063D, 1064D, 1065D, 1066D, 1067D, 106

SOFTWARE SALE

Microsoft Office 97 Std	\$200
Microsoft Office 97 Pro	\$300
Microsoft Office 4.3 Pro	\$240
Microsoft Win Svr.NT 4	\$450
Microsoft WinWk.NT 4	\$150
Microsoft OfficeMac 98	\$290
MS Visual Basic Pro 5	\$150
MS Word/Excel(Each)	\$155
MS Project 98	\$260
Adobe Photoshop 5.0	\$350
Adobe Pagemaker 6.5	\$300
Adobe Illustrator 7	\$200
Macromedia Freehand 8	\$200
NetObject Fusion	\$150
Autocad LT W/97	\$320
Visio IntelliCAD98	\$270

SOFT PRO

1(800) 876-7529All trademarks are property of their respective owners.
prices subject to change

ZD Marketplace

**POINT OF SALE
Inventory Control**

Software & Hardware for:



- Retail/Wholesale
- Mail Order
- Internet Commerce
- Rentals
- Service/Repair
- Manufacturing
- Kiosk Development

Fully Integrated Accounting • Multi-Site Polling

Demo's available on web site or CD Rom

Barcode Readers • Receipt Printers

Cash Drawers • Mag Stripe • Ribbons/Paper/Labels

Credit Card Authorization & Deposit Software

www.posdirect.com

(800) 622-7670 • sales@posdirect.com

(618) 985-8237 vox • (618) 985-3014 fax

P.O.S. →
DIRECTOrder Free Demo
CD Rom on Web Site

Cutting Edge Retail Technologies

All Your Bar Coding Needs**Free 132 Page Catalog**

- Best Prices • Volume Discounts
- Your Own Free Technical Consultant
- Toll Free Technical Support
- No Hassle Money Back Guarantee
- Same Day Shipping

SYSTEM ID
WAREHOUSE**www.systemid.com****800-397-9783****972-516-1100****Special Dealer/VAR Discounts Available!****Portable Readers**

- Operates on one 9-volt battery
- 54-key alpha/numeric keyboard
- Date and time stamps
- Auto power off with resume
- Incorporates American Microsystems' industry-leading decoding algorithm

We Proudly Feature

symbol**Laser
Scanners!****30-day No Risk
Guarantee!****The
Power to
be Efficient.****CCD Packages**

- Including decoder & cables
- Very fast and accurate
- No moving parts to break
- Completely solid state
- Ergonomic design
- Very rugged and durable
- Less expensive than lasers

45 67890

Label Design Software

- Full range of bar code capabilities
- Very easy to use
- Full featured label design software for Windows
- Scalable fonts
- Rotatable text and graphics
- Floating color and tool bars

**Lifetime Toll-Free
SUPPORT!**Omnidirectional
Laser Packages**NEW!****Mag Stripe Packages**

- Includes decoder & cables

**CALL NOW FOR A
FREE CATALOG!****AMERICAN**
MICROSYSTEMS, LTDphone 817 571 9015 • fax 817 685 6232
2190 Regal Parkway • Euless, Texas 76040**800 648 4452 WWW.AMLTD.COM****15 years in business • 30-Day money back guarantee • Same-day shipping**

ZD Marketplace

www.BARCODEHQ.COM

Bar Code Labeling

LabelRIGHT Software \$295

- Any Format, Any Label. WYSIWYG
- Formats for Sears, K-Mart, Penney's, WalMart, EIA, AIAG, etc.
- Code 128, UPC/EAN, 2 of 5, Codabar, Code 39
- Lines, Boxes, Rotations, Color, PCX, BMP, etc.
- Simple Custom Operator Interface
- Prints to LaserJet, DeskJet, and Dot-Matrix.
- DOS Version too - only \$279



Bar Code Fonts \$199

- For Windows and Mac
- Insert bar codes into any font based Windows program
- Prints Code 39, UPC/EAN, Code 128, PostNet, Codabar, 12 of 5
- Hotkey Desktop Translation or DLL for Programmers

Bar Code Printers

- Complete Package - \$895
- Thermal Transfer Printer for Bar Codes, Text and Graphics
- Includes Windows or DOS Software, Cable, Labels and Ribbon
- Up to 4 inch label width
- High Speed and Industrial Models Available



Wireless Readers

- Cordless On-line Scanning
- Transmits up to 100 feet
- Complete One-Way Wand - \$395
- Two-Way Laser with Base - \$1650
- No license necessary
- Base attaches as a second keyboard
- Serial attachment also

Wireless Terminals

RF Data Terminal

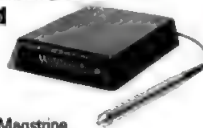
- 1,000 ft. Range (1,000,000 sq. ft.)
- Scan and Key Data On-line
- Computer Sends Display and Triggers Voice Messages on Terminal
- All Programming on Host (VB, C, Access, etc.)
- Bar Code Input by Wand, Laser or CCD
- Base Station - \$845 (up to 16 Terminals)
- Complete Terminal with Wand - \$1215
- With Integrated Laser Scanner - \$1790



Fixed Readers

Keyboard Wedge Wand \$299

- Attaches as second keyboard
- No software needed
- For Windows, DOS, Mac
- Code 39, UPC/EAN, 128, 2 of 5, 93, Codabar, etc.
- Wand, Laser, CCD, Slot Badge and Magstripe



Keyboard Laser Reader \$659

• "Point and Shoot" Reading



- Decoder Built into Laser
- No extra box
- For PC and Mac
- Code 39, UPC/EAN, 128, 93, Codabar, Interleaved 2 of 5, etc.
- Lifetime Warranty on Scan Element
- Withstands 5' Drops to Concrete

Laptop Laser Reader \$795

- Does not Draw Power from Laptop
- 4 AA Batteries in Handle or Uses Wall Power
- Attaches to DB-9 serial port
- Supplied Program makes Scanned Data Appear as Keyed

Portable Readers

Batch Data Collection Unit

• 84K Unit with wand \$750



- Scan and key Data to Memory
- Battery Operated (3 AAs)
- Upload collected data to host computer - serial or keyboard
- 2 Built-in Inventory Programs
- Patented Voice Prompts
- XModem Serial Upload
- Windows and DOS Uploading Software Included at No Charge
- Easy to create custom prompts and custom voice messages.

- Cord Attached Wand, Laser or CCD

• 84K Built-in Laser Model \$1299

- Laser Scanner built-in to top
- One hand scanning
- Right hand or Left hand
- Eliminates cord and separate scanner
- Very rugged and lightweight
- Windows and DOS Uploading Software Included at No Charge
- Lifetime warranty on scan element



Ordering is Easy! 1-800-345-4220

Europe Phone: (353) 1 6614 588 • Fax: (353) 1 6614 622 • USA Phone: 811-458-9938 • Fax: 811-458-9984 • www.barcodenhq.com

- Made in the USA
- 800 Tech Support
- 30 Day Money Back Guarantee
- 2 Year Warranty on Readers
- Free, Same Day UPS Blue Shipping
- Direct from the Manufacturer
- Better Support, Service, Advice
- 13 Years of service
- Widest range of Products Available
- See Website for Complete On-line Catalog

Sales, Service and
Support Direct From
the Manufacturer

See us at Fall Comdex, Booth L7157

WORTHINGTON

DATA SOLUTIONS

CALL FOR FREE
CATALOG AND
BAR CODE
PRIMER!

BAR CODE



SOLUTIONS

- Bar Code Fonts/Graphic Utilities
- Wizard Labeling Software
- Scanners/Lasers/Printers
- FREE Consultation & Support
- VAR & OEM Opportunities

Order your FREE Guide to Bar Coding Today!

Toll Free in the U.S.

800 232-7625

International
330 672-0244

Bear Rock Technologies has provided quality
Bar Coding and Labeling Solutions for 14 years!

Visit us Online: www.bearrock.com



Distance Education / Home Study

**ACCREDITED
B.S. DEGREE**

in
Computer Science
or

Computer Engr. Tech.

Easy-to-study lessons written by the
Grantham staff, and supplied to students
along with software and instructional
assistance and personal help by mail,
phone, fax. Our emphasis is on teaching
you and guiding you to professional
competence as well as your B.S. degree.

VA Approved. Our 48th Year
Accredited Member DETC

Catalog, Toll Free:
1 (888) 423-4242

GRANTHAM
College of Engineering

Grantham College Rd., Sisseton, LA 70469-5700

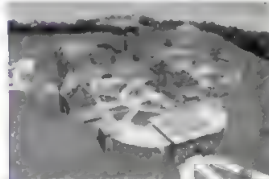
E-mail: gce@grantham.edu

Web site: <http://www.grantham.edu>

ZD Marketplace

ADDRESS FOR SUCCESS

<http://www.aics.edu>



- Earn B.S. and M.S. in Computer Science
- NEW B.S. program in Information Systems
- Distance Education
- Object oriented B.S. program
- Approved by more than 275 companies
- Follows ACM/IEEE guidelines
- Thousands of students throughout U.S.

Free catalogue: **1-800-767-AICS**
or www.aics.edu

STUDENT COUNCIL AND APPROVAL

AMERICAN
INSTITUTE
COMPUTER
SCIENCES

TOTAL RECALL
THE DATA RECOVERY COMPANY

PROFESSIONAL DATA RECOVERY SERVICES.



1-743-0594

Data recovery from all retailing media and most operating systems. Authorized by all leading manufacturers.

www.mca.com

ZD Marketplace



Lost Data?

Data recovery through your modem in hours - not days - only from Ontrack.

Ontrack.
Defining Data Recovery Solutions Worldwide

1.800.872.2599
www.ontrack.com

Come see us at Comdex Fall '98, Booth N106, Las Vegas Convention Center

ZD Marketplace

CD-R Duplication Systems
for Software, MIS, Audio & Multimedia Needs




CDR5000™

- Hi speed CD Duplicator
- Copies up to 450 CDs unattended
- CD Printer

CDR3500XL™

- Standalone CD Duplicator
- Copies up to 100 CDs unattended

PRICES AS LOW AS \$1295.00

COPYPRO 2000™

- Diskette Duplicator
- Copies up to 260 disks/hour

COPYPRO CD-R TOWERS

- Multi-disc copier
- Copies up to 28 discs/hour
- CD Printer Option

CD-R MEDIA BEST PRICES CALL!!

Check our Web site for monthly specials:
www.copypro.com

COPYPRO Inc., 4020 Pike Lane
Concord, CA 94520-1227

COPYPRO
Professional Duplication Systems
Made in the U.S.A.

Tel: 925-689-1200
Fax: 925-689-1263

1-800-887-9906

ZD Marketplace

ECO Data Recovery

Win95+NT, DOS, MAC
Novell, OS/2

- FLAT RATE
- NO EVALUATION FEE
- 18 YEARS EXPERIENCE
- 24 HR. SERVICE AVAILABLE
- CALL US LAST!

800-339-3412

DATA RECOVERY IN HOURS

- Over 10 years of experience with clients worldwide (HP, NASA, & FedEx).
- We've recovered more than half-a-million megabytes of lost data.
- You only pay if there's a recovery.
- Call 24-hours a day.



LAZARUS
DATA RECOVERY
Working at the speed of business.

800-341-DATA

415-495-3556 • FAX 415-495-3553 • RESTRICTION: SAN FRANCISCO
379 Clementina Street • San Francisco, California 94103

Blank CD-Rs 89¢

High Quality Blank CD-Rs	Duplication & Printing
Pks 50 59.50	CD-R Duplication: Call
Pks 100 99.00	CD-R Printing: Call
Pks 200 178.00	Replication: Call
Gold on Gold 100 99	Diskette 3.5" Call
Silver on Blue 100 99	Printable CD-Rs
Silver on Silver 100 99	Silver Surface 100 1.09
with Free Sleeves	Gold Surface 100 1.09
100% Satisfaction Guaranteed	White Surface 100 1.09
TDK • SONY	Zip & Jaz
TDK J45 50 1.79	Iomega Zip 100 9.95
Sony J45 50 1.89	Iomega Zip 50 9.49
Mitsui Gold 50 1.99	JAZ 1GB 3 79.95
	JAZ 2GB 3 99.95
	3.5" FMTD HD 25¢

AMERICAL MICRO PRODUCTS, INC
800-644-4404
www.americal.com

Visa • MC • Disc • Amex • Corp./Gov't Accts Welcome

ZD Marketplace

Serious Software Licensing & Copy Protection without hardware keys or disk keys

Distribute your software via Internet, CD-ROM or floppy with full security.



CrypKey

CrypKey provides solid copy protection with a broad range of features to control all aspects of your product's operation. You can offer free, automatic one-time trials, turn demos into full multi-user network versions, or sell specific options by phone, fax or email. Sell usage by time, runs, features - the control is all there - easy to implement and easy to support.

Try it free from our website to see why we're rated #1 by professional programmers who seek the best combination of security, features, ease of use, reliability & price.

100% Satisfaction Guaranteed!

email: info@crypkey.com
Ph: 403-258-6274
Fc: 403-258-6201

http://www.crypkey.com

ZD Marketplace

DATA RECOVERY

By Nick Majors' DATA RECOVERY LABS

"The Best Data Recovery Service available - Anywhere - at any Price!"



Datarec.com
DATA RECOVERY LABS

USA • Canada • Japan • Brazil

1-800-563-1167
www.datarec.com

- Specializing in HIGH-END / TOP PRIORITY JOBS - including hard drives, removables, network servers, advanced operating systems, multi-drive RAID/array configurations, optical jukeboxes and tape / DAT recoveries. (Windows - NTFS - Mac - Dos - Netware - UNIX)
- Data can be recovered whether loss is due to hard drive failure, hard disk crash, user or configuration error, virus damage, unexplained data loss, fire, flood, earthquake, water or smoke damage.
- Technical expertise that is *Second to None!* Technicians with years of data recovery experience, custom methodology training, and access to original research of network and operating systems, drive technologies, controller interfaces, data structures, file formats, and computer hardware/software design.

ZD Marketplace

DATA CONVERSION SOLUTIONS

We Take on Impossible Projects & Deadlines!

- Cost Effective Long-Term Outsourcing
- Fortune 500 Clients
- Same Day Service In Most Cases
- World Class Software Developers
- Over 10 Years of Experience

1-(800) 4-FRIDAY
FRIDAY'S COMPUTER, INC.
FRX • 201-441-5529
email • fridayscomputer@compuserve.com

ZD Marketplace

DATA RECOVERY

Lost your data? Don't panic, call:

800-886-2231

When you absolutely must have your data back!

- ♦ Recovering your data is our only business
- ♦ 14 years of experience
- ♦ Over 30,000 successful data recoveries
- ♦ We recover data others give up on or simply abandon
- ♦ All operating systems and media types
- ♦ 24 hours, 365 days
- ♦ Free evaluation

Free data recovery tips and advice:
www.datamechanix.com

DATA MECHANIX 18271 McDermott, Building B, Irvine CA 92714
telephone: 714-263-0994 facsimile: 714-263-1549

ZD Marketplace

CD DUPLICATORS & Speedy Duplicating Services

YOU CAN'T BEAT THIS!

- ✓ Expert Advice
- ✓ Guaranteed Lowest Price
- ✓ Best Selection Anywhere



MULTIMEDIA RECORDING SYSTEMS

800-210-0265
610/594-1603 fax: 610/594-6199



MediaForm
Rimage
Champion
Fargo
Super Image
Hoei Sangyo
Cedar

ONLINE CATALOG
www.gomrs.com

DIGI-ROM

Full Services For Electronic Media

MASTERING REPLICATION PRINTING
CD-ROM • DVD • AUDIO CD

- CD-ROM One-Offs: Same Day - On Site
- 1000 CD-R Duplication: Next Day - On Site
- Video Compression: BetaSP & VHS to AVI, Quicktime, MPEG1 & MPEG2: On-Site
- DVD Pre-Mastering: On-Site
- DVD-R Disc Duplication: On Site
- Replication from 1 to 1,000,000 discs
- Personalized Service: Outta Sight!

800-815-3444

In New York City call 212-730-2111

www.digirrom.com

ZD Marketplace

DATA CONVERSION

TAPES • DISKS • CARTRIDGES
DISKETTE/TAPE DUPLICATION

NDC CONVERTS DATA/DOCUMENTS BETWEEN MORE COMPUTERS THAN ANYONE ELSE!!

3590/3480/3490E • 8/4MM
DLT • QIC • TK50/70/80 • CD-ROM
IBM, DEC, VAX, APPLE, WANG, AS/400
Lotus, Access, SQL
SAS, SPSS
DC6150/6525
mainframes
UNIX, 9-Track
ORACLE, CP/M
download/upload via FTP



NATIONAL DATA CONVERSION INSTITUTE
5 E. 18th St., NY, NY 10003 www.ndci.com

(877) 777-NDCI
(212) 463-7511

AMERICA'S LEADERS IN DATA CONVERSION

tiramisu®



Data Recovery Software

Recover it yourself!

Save money!

Thousands of satisfied customers world-wide!

Support for:
FAT16/FAT32/WIN95-98
Windows NT (NTFS)
NOVELL 3.x/4.x (NFS)

Fast registration turnaround!
Try before you buy! Test for free the integrated diagnostic module!

More information at:
www.recovery.de

CONVERSIONS DUPLICATIONS

TAPE 9-Track • 3480/90/90E • DLT • QIC • 8mm • 4mm
DISK CD-R • 8" • 5 1/4" • 3 1/2" • 3"

Convert DP records/fields
Convert legacy WP
data via FTP site or BBS

800-357-6250

PHONE: 317-842-2077 EXT: 300

FAX: 317-842-8294

WEB: <http://www.shaffstall.com>

E-MAIL: support@shaffstall.com

Systems Sales & Services

SHAFFSTALL CORPORATION

7901 East 88th Street
Indianapolis IN 46256

ZD Marketplace

COPY CDs ON YOUR DESKTOP!

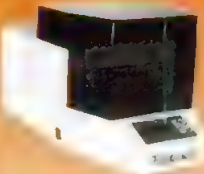
Champion Comet ▶

- Hands-Free CD Printing!
- 50 Disc Capacity
- Bundled with the Fargo Signature Printer



▶ TraxCopier EL

- Desktop CD-R Copier
- 50 Disc Capacity
- Ultra-Simple to Use

▶▶ CD-R Copiers
starting at \$1395!

CHAMPION IS YOUR MOST EXPERIENCED SOURCE
FOR DUPLICATION EQUIPMENT, SUPPLIES,
AND DUPLICATION SERVICES

www.championsms.com

888-723-3475

See us at Fall Comdex, Booth #56922

ZD Marketplace



MICROTECH
IMAGE
AUTOMATOR

Software Manufacturing
CD-R, CD-Rom, Disk
CD-R Duplication Hardware
Document Scanning
Books/Catalogs on CD
On-Demand Digital Publishing
Digital Distribution
Printing
Packaging
Fulfillment, Distribution

SOFTWARE REPRODUCTION TECHNOLOGIES, INC.



11 East 24th Street, New York, NY 10010
Phone: 212.989.2345 800.829.7527
Fax: 212.989.3387
Internet: www.srtnyc.com

ZD Marketplace

DISKETTE DUPLICATION CD ROM REPLICATION PRINTING & PACKAGING WAREHOUSING DISTRIBUTION

Floppy Copy
INCORPORATED
Integrated Software Services

3822 WEST 1907 SOUTH • SALT LAKE CITY, UTAH 84104
801-975-9411 • FAX 801-975-9394 • 1-800-732-3475

DID YOU HEAR?



1. Blank CD-R Media

Qty. 100 - \$1.65
MTC, TDK or Verbatim

2. Custom Screen Printing

Qty. 100 - \$3.40
One Color / includes Setup
2 & 3 Color also available

3. Duplicated CD-R

Qty. 100 - \$6.90
Copied & Verified / 1 Color Printing

"You'll Like Our Prices-
You'll Come Back for Our Service!"

DIVERSIFIED SYSTEMS GROUP, INC.
800-255-3142

Visit our Web Site: <http://dsgi.com> ■ e-mail: info@dsgi.com

ZD Marketplace

PC Magazine's BusinessCard section is a
forum for innovative, hard-to-find and
low-cost PC products and services. Ads are
listed by product category.

Rates:

1 issue-\$1,145, 3 issues-\$1,000,
6 issues-\$970, 12 issues-\$920,
17 issues-\$865, 22 issues-\$855

Multiple-ad per issue rates also available.
Prepayment must accompany each insertion.
VISA/MC welcomed.

Please send copy and payment to:
PC Magazine BusinessCard
One Park Avenue, 3rd Floor
New York, NY 10016

For more information, call 800-825-4237
or 212-503-5115, FAX: 212-503-5860.

PC
MAGAZINE
MARKETPLACE

BUSINESSCARD

COMPUTER / COMPUTER INSURANCE

Insures Your Computer

The COMPUTEROWNERSSM insurance policy repairs
or replaces hardware, media and purchased soft-
ware. Rates as low as \$49 a year covers theft,
fire, accidents, power surge and more! Call for
immediate coverage or info. 1-800-800-1492.

Safeware, The Insurance Agency Inc.

5760 N. High Street P.O. Box 656
Columbus, OH. 43085

SOFTWARE / DATA ENTRY

The Data Entry EmulatorSM

Full featured, heads-down data entry with two-pass
verification, edit language, output record reformat,
operator statistics, batch control, on-line help, free
tech support, key from images (NEW!).
For PC, PC LAN, S/36, or AS/400.

Computer Keyes

21929 Makah Road, Woodway, WA 98020
800-356-0203/425-776-6443/Fax: 425-776-7210

BIZAR.COM from Amsterdam
THE WEIRDEST SEX ONLINE
 BONDAGE • FETISH • S/M • D/S • EXTREME
 FREE 25,000 EXTREME SEX PICTURES
 FREE 2400+ BIZARRE SEX VIDEOS
 FREE BONDAGE/S/M DATING AREA
WWW.BIZAR.COM/FREE/

Hot & HEAVY
 100% UNCENSORED
 100% HARDCORE
 from Amsterdam
 UNLIMITED LIVE TEEN SEX
 We have it all!
 100 000+ XXX Pictures - 9000 Online Videos
 International Dating Area - Jocktop - 1D/18 - Rador
WWW.HH.NL
 adults only 18+

Cutting edge adult
 web technologies
 on display now!

Not for the
 faint of heart!

18+ ONLY!
CURIOUS?



www.hornyhippo.com

HOT! NEW! FREE!
 Totally ~~FREE~~ Sex Online
 Visit us at **http://www.**
FREE highsocietymag.com/pm
 All-sex, all-celebrity highlights
FREE amateurarcade.com/pm
 The net's finest newcomers
FREE nude-n-natural.com/pm
 Just 18 and eager to please!
FREE fullthrust.com/pm
 The web's horniest couples get hot
FREE planetlesbo.com/pm
 Out-of-this-world lesbians
FREE babesunlimited.com/pm
 The internet's most gorgeous girls
FREE hotnudemen.com/pm
 The hottest all-male site on the web
FREE hollywoodheat.com/pm
 Tinseltown's starlets exposed
FREE ygai.com/pm
 Young, sweet ladies for the asking
www.cun-tv.com
 TOTALLY LIVE, TOTALLY NUDE
 Must be 18 or Over **PM.08**

Visit a Place
 Where The Adult
 Entertainment
 Is The Hottest
 In The Universe!
**Venus
 Ville**
www.venusville.com
 YOU NEED A VACATION!
 You Must Be 18 Or Older

BEST OF THE NET
 Top Rated By Users
 ADULTS OVER 18 - **18+**
freelook.com/tramps
 nude, lewd, rude & raw
freelook.com/fetish
 hottest cyber-action, all the time
twogirlsex.com/raw
 nasty, naughty-down & dirty
hotsamples.com/sex
 stuff you've never even dreamed of
online18.com/wet
 fulfill your fantasies with buxom beauties
skinshots.com/taboo
 sensational site for sensual skin
strokeoff.com/raw
 the name says it all - nothing left out
twogirlsex.com/nude
 they must need the work if they like it!
uncensored.com/dm
 explore your wildest dreams
online18.com/gay

BABYLON-X
www.babylon-x.com/3
 Loads the Pix no-one else Dares!
 Rare Celebrities -
 Genuine Hardcore!!
 sneaky shots* X home
 video X* bedroom polaroids
 Princess Di, Pam & Tommy,
 Claudia, Jennifer, Cindy
 Spice Girls... 3,000
 celebrity shots!!
 Hidden Cameras,
 College Spy - cam!!
HUGE SITE -- FREE
 Plus: U.S. Directory
 of Hometown Hookers
10,000 Pix! 2000
videos! 15 Shows!
 Adults Only

IT Professionals

Want to Set the World On Fire?



We've Got Your Match.

IT professionals are in demand. Go for that dream job! Post your resume at www.jobEngine.com, the new high tech job-search Web site operated by Ziff-Davis and I-Search, the leading provider of Internet recruitment databases.

Powerful, proprietary software will scan and mine your resume for nuggets of information and ask a few questions. Quick as a flash, employers worldwide looking to fill a position you fit are able to spot you.

You can search too. Whatever your criteria — location, job title, adrenaline index — jobEngine™ will find you likely job matches in moments. And it's confidential!

Whether you're looking for a career change or a new project to light your fire, we've got your match. You'll see. **Post your resume now.**

www.jobEngine.com

Matchmakers For Computer Industry Professionals



EMPLOYERS, MAKE jobEngine YOUR FIRST
 CHOICE WHEN YOU HAVE A POSITION TO FILL.
 Email: recruit@jobEngine.com

Info Link

from
PC MAGAZINE
www.pcmag.com/infolink

Online Reader Service/Free Product Information

Want to learn more about a company or product you see in PC Magazine?
Go to www.pcmag.com/infolink

From there, you can select a product category, company name or InfoLink number. Then choose to get your information via phone, mail or e-mail. You can even link directly to a vendor's website.

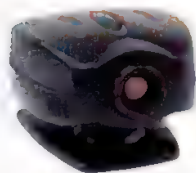


ADVERTISERS' INDEX BY COMPANY

Infolink No.	Advertiser	Page	Infolink No.	Advertiser	Page	Infolink No.	Advertiser	Page	
*	3 Com Corporation	164-165	090	Everex Systems International	266	038	PC Connection	81-83	
*	3 Com Corporation	274-275	213	Executive Software	306	047	PC Connection	360-361	
077	3Dfx Interactive	248-249	211	Executive Software	320	330	PC Mail	368-369	
056	A Trend Technology	309	099	Gateway	48A-49	080	PC Power & Cooling Systems	94	
096	Acer Peripherals America	410	017	GCC Technologies	246-247	151	Philips Electronics	204	
081	ACS Innovations	281	082	Genicom	321	032	Philips Electronics	414	
025	Addonics Technologies Corp	343	200	Gigabyte	339	*	Pitney Bowes, Inc.	311	
*	Advanced Micro Devices	214-215	*	Hewlett Packard Commercial PC	18-19	293	Play	403	
*	Altra	332	*	Hewlett Packard Color Printers	136-137	239	Plextor	336	
162	American Power Conversion	84	*	Hewlett Packard PhotoSmart	155	174	Premio Computers	319	
235	AMS Tech	53	*	Hewlett Packard PhotoSmart	157	148	Primavera Systems	217	
212	ADOpen America, Inc.	344-345	*	Hewlett Packard LaserJet Printers	188-189	287	ProGen	98-99	
*	AST Computers	65	*	Hewlett Packard	213	078	Promise Technology	291	
*	Asustek	324-325	140	Hitachi NSA	322	105	Proxim, Inc.	287	
101	ATI Technologies	237-240	002	HotOffice Technologies	279	357	Psion Dacom	289	
355	Axis Communications, Inc.	304A-304D	*	Hughes Electronics	57-59	024	QMS	294	
010	Axis Systems	359	060	Hyundai Electronics	412	290	Quantex Microsystems	105-110	
347	Banner Blue	413	*	IBM	120-121	*	Quarterdeck Corporation	199	
136	BOLData	72	084	iiyama North America	40	309	S.A.G./Storage Solutions	46-47	
*	BuyCom	78-79	184	iiyama North America	86	*	Samsung Electronics	305	
345	Caere Corporation	95	263	Impression	313	*	Seagate Technology	31-34	
*	Canon Computer Systems	22-23	*	Intel Corporation	38-39	227	Shamrock Peripherals, Inc.	348	
*	Canon USA	124-125	*	Intel Corporation	135	*	Shiva	285	
177	Cardiff Software	307	166	Intelogis, Inc.	276	284	Smart and Friendly	417	
158	CDW Computer Centers, Inc.	68-69	170	Interland	328	167	Smile Int'l	340	
159	CDW Computer Centers, Inc.	70-71	*	Intuit, Inc.	92	*	Sony Electronics, Inc.	74	
360	CDW Computer Centers, Inc.	370-371	*	Iomega Corporation	253-256	071	Sony Direct	14	
*	Choice Hotels International	265	106	Kingston Technology Corporation	314	388	Sony Electronics, Inc.	54-55	
*	Choice Hotels International	267	064	Lemout & Hauspie	159	014	Sony Direct	146-151	
*	Choice Hotels International	269	053	Lexar Media	405	*	SPSS, Inc.	363	
*	Choice Hotels International	271	094	Lexmark International Inc.	203	247	STB Systems, Inc.	20	
012	Chuntex Electronics Co, Ltd.	342	*	Lotus Development Corporation	210-211	*	Symantec Corporation	191-194	
*	Compaq Computer Corporation	141-144	169	Maptech	407	007	Tapepi Computer Association	349	
*	Compaq Computer Corporation	206-209	380	Matrox Graphics, Inc.	226	349	Tatung Co.	341	
*	Compaq Computer Corporation	102-103	299	McAfee Software	112-113	*	Tektronix	116-117	
*	Compaq Computer Corporation	302-303	283	MegaHaus	357	019	TeleVideo	308	
*	Compaq Works	317	191	Mendian Data	292-293	*	Texas Instruments, Inc.	131-133	
332	Corel Corporation	268	027	Micro Solutions Computer Products	366	068	TigerDirect	422-423	
095	Creative Labs	60A-60H	003	Micro Warehouse	364-365	377	Toshiba	26-27	
203	Crucial Technology	184-185	070	Micrografx, Inc.	326	028	U-Tron Technology	8	
128	CTX OPTO	310	119	Micron	5	242	Umax	25	
059	Cyber Corporation	288	098	Micron	36A-37	243	Viagrafix	312	
333	D-Link Systems	283	013	Micron	169-175	118	ViewSonic	62-63	
051	Data Comm Warehouse	297	*	Microsoft Windows CE	2-3	298	ViewSonic	88	
*	Dell Computer Corporation	C5-C8	*	Microsoft	219	117	Optquest	270	
*	Dell Computer Corporation	12-13	*	Microsoft	221	*	Visio	235	
*	Dell Computer Corporation	90-91	*	Microsoft	223	043	Visioneer	264	
*	Dell Computer Corporation	128-129	*	Microsoft Money 99	273	*	Wal-Mart Stores, Inc.	409	
*	Dell Computer Corporation	160-161	091	Microtek	335	085	Winbook	415	
*	Dell Computer Corporation	196-197	089	Mindspring	290	273	Xircom	15	
*	Dell Computer Corporation	258-259	036	Mitac International Corp	346-347	006	Xirlink	400	
*	Dell Computer Corporation	367	280	Mitsubishi Electronics	200	*	ZD Events	358	
*	Diamond Multimedia Systems	45	254	Monorail	96	*	ZD Net	168	
*	Diamond Multimedia Systems	153	155	NEC Computer Systems	178-179	*	ZD Net	262-263	
*	Diamond Multimedia Systems	261	154	NEC Computer Systems	180-181	*	ZD-TV	329-331	
083	Digital Persona	421	157	NEC Technologies	C2-C4, 1				
*	DLTape Systems	67	127	Nokia Display Products	245				
372	DTK Computer	323	*	Novell, Inc.	16-17				
*	E*TRADE	230-231	*	Number Nine Computer Corp.	272				
232	Elsa, Inc.	411	046	nVidia	242-243				
016	Enfish Technologies	352	*	Oracle Corp.	11				
004	Epson America	58	*	Orlimar Golf Company	350				
005	Epson America	233	209	Panda Software	295				
240	ESRI	298	397	Pantone, Inc.	353				

*No InfoLink. Call Advertiser for More Information

GET VISUAL, GET C-IT!



Simple. It has nothing to do with words.

With C-it PC Camera and C-it Mail™,

I turned my PC into a

VIDEO MAIL CENTER.

My friends can see

the real me.

IT'S ME.

IT'S ORIGINAL.

IT'S C-IT!



C-it

PC CAMERA WITH C-IT MAIL™ (ONLY \$99)

www.c-itnow.com

INGRAM MICRO

IBM Direct: 1-800-426-7235 x4666

PC Connection: 1-800-800-5555 (sku#103549)

Tiger Direct: 1-800-335-4055

Micro Center: www.microcenter.com

Available at Computer
LIVE! #15770

Xirlink, Inc.
1-800-928-8008

Choose 006 at www.pcmag.com/infolink

AFTERHOURS

THE HOME SIDE OF COMPUTING



POWER GAMING

High-Octane

By Bruce Brown

Gamers revel in the bleeding-edge technologies used in new releases, including the latest 3-D graphics, full-motion video, and 3-D audio. To drive the gobs of data involved, good game systems need fast CPUs and bales of system RAM and graphics adapter memory. Games take advantage of capacious hard disks, and the bigger and sharper the monitor, the better.

The picture is clear: To play the coolest new game titles and be ready for the next generation, you need a hot PC. The six

games reviewed here (from EA Sports, Eidos Interactive, Panasonic Interactive Media Co., Red Storm Entertainment, RMC Interactive, and Ubi Soft Entertainment) represent a variety of strategy, role-playing, racing, education, and sports titles, but each gives the most rewarding game play with a high-end PC.

Final Fantasy VII

Final Fantasy VII is the PC version of the role-playing game that ruled the Sony PlayStation world in 1997. You assume the role of Cloud, an ex-soldier out

to halt Shinra, a corporation bent on destroying the planet.

Although Cloud begins the game as a mercenary, his motivation changes as he travels and fights alongside dedicated revolutionaries. To succeed, you must master the use of the magic elements of "materia." The game's greatest appeals are the intricacy of the story and depth of the characters.

The story line is fleshed out

by extensive artwork, detailed cities and towns, an impressive real-time battle system, and more than 60 minutes of full-motion video.

The minimum system requirements for the game, which comes on four CD-ROMs, are a 133-MHz Pentium-based system with a hardware 3-D accelerator (or a 166-MHz Pentium without hardware acceleration), 32MB of RAM, 260MB to 460MB of hard disk space, a 4X CD-ROM drive, and a DirectX 5.0 sound card. For maximum performance, you'll want to install as much of the game as possible on your

PC's hard disk, so count on devoting about 500MB of disk space. The game's complex graphics load much more quickly when you have more than the minimum required memory.

The graphics in the PC version of Final Fantasy VII aren't as smooth as they are on the PlayStation, but the video clips are comparable and the combat sequences are better (thanks to 3-D acceleration). With its captivating story and numerous plotlines, Final Fantasy VII is a keeper.

NHRA Drag Racing

Do you hanker to sit behind the controls of a thundering road rocket, where the major challenge is to go very straight, very fast, without blowing up or hitting anything?

NHRA Drag Racing is an

BLUE'S CLUES

The super popular TV canine makes her PC debut with an adventure game and an activity title. *Page 406.*



OUT OF THIS WORLD

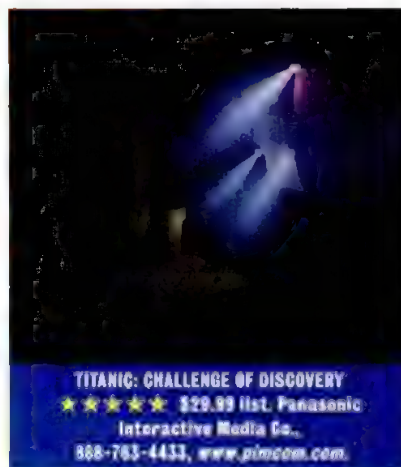
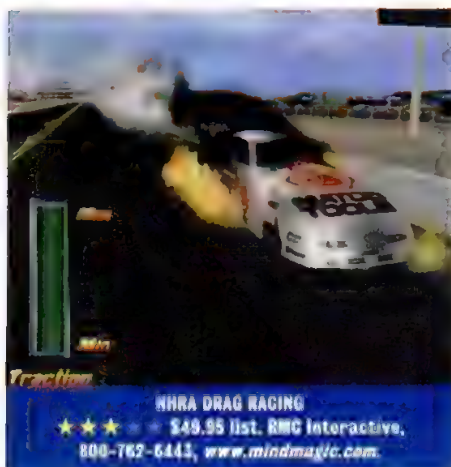
Independence War is a superior space combat game. *Page 406.*

LANGUAGES MADE EASY

Kaplan's Spanish and French for the Real World give beginning students a head start. *Page 408.*



AFTER HOURS



action and strategy game in which choosing your crew chief and properly tuning the engine of your dragster or funny car are as important to winning as hand/eye coordination. This thriller makes good use of 3-D graphics and digital 3-D audio, recorded live at NHRA events. Once you get the hang of the game play, you can select day or night events at 19 different NHRA racetracks, picking out single races or working through a full season.

Hardware 3-D graphics is a must. A 133-MHz Pentium sys-

tem with 32MB of RAM, a 4MB 3-D graphics card, a DirectX 5.2-compatible audio card, and a 2X CD-ROM drive will get you started, but the recommended system is at least a 200-MHz Pentium with 64MB of RAM, an 8MB 3-D graphics card, a 4X or faster CD-ROM drive, and a joystick or steering wheel with pedals. The Windows 95/98 game includes the required DirectX 5.2 and Direct-

Media. Force feedback is not supported, however. The energy and sound of real-life drag racing are evident

throughout, but the user controls and the structure of the game aren't readily apparent. To go very far with NHRA Drag Racing, you'll need to spend time learning the program basics, but as in the real world of racing, preparation and practice pay off.

Redline Racer

With velvety smooth graphics and detailed backgrounds, Redline Racer is an outstanding example of a fast-action 3-D playing environment. From across the room it looks like full-motion video.

In the course of play, you qualify and choose from 8 Super GT motorcycles, 16 animated male and female characters, and 10 different tracks. The bikes are fast and handle wonderfully as long as you can keep them on course; good hand/eye coordination pays off here.

Plentiful 3-D graphics effects such as sparks, smoke, sun glare, and physics-based motion modeling all add to the excitement, with the base animation sequences running at 60 frames per second. The sounds of the bikes and music from a choice of five sound tracks add to the tension.

System requirements start with a 3-D accelerator card and a Windows 95/98 PC. As little as 16MB of RAM on a 133-MHz Pentium-based system is sufficient with a 3Dfx card, but a

166-MHz PC is needed for any other 3-D board. To get the most from the game, the recommended configuration is at least a 200-MHz Pentium system with a PCI or AGP Direct3D 3Dfx graphics card and 32MB of RAM. Force-feedback controllers are supported but optional, as are Direct3D Sound and Aureal A3D surround sound. Up to eight players can join in via the Internet, a network, or a modem, or through a direct PC connection.

Easy to play but challenging as well, Redline Racer is a top choice for anyone who enjoys the feel of speeding along streets, highways, tracks, and beaches. Winning requires choosing the right bike for each track, but the fun starts as soon as you load the game.

Titanic: Challenge of Discovery

Forget Leonardo and Kate. The more compelling attraction of the *Titanic* is the massive efforts behind the scenes as Dr. Robert Ballard and his team of oceanographers searched for the ill-fated liner. For those who want to gain an explorer's perspective, *Titanic: Challenge of Discovery* is a marvelous strategy and simulation experience, loaded with educational content and enhanced by qual-

What It Takes to Play

To test these power-loving, resource-hungry games, we acquired test systems from Gateway (800-848-4208, www.gateway.com) and Micron Electronics (800-209-9886, www.micron.com). The configuration specs of the recommended systems follow, with pricing obtained just before press time.

Both companies sent systems based on 400-MHz Pentium II processors in medium tower cases. Each computer came with 128MB of 100-MHz SDRAM, a 14.4GB 7,200-rpm Ultra ATA hard disk, a monitor nominally measuring 19 inches diagonally, integrated 64-bit audio, and a U.S. Robotics 56K Winmodem. Each PC ran Microsoft Windows 98.

The hardware high points of the Gateway G6-400 (\$2,738 direct) included a Toshiba DVD II drive, the STB Velocity 128ZX (an 8MB AGP graphics accelerator), a 12MB 3Dfx Voodoo2 3-D accelerator, and Boston Acoustics BA635 speakers with subwoofer.

The Micron Millennia 400 MAX (\$2,899 direct) was outfitted with a 32X CD-ROM drive, an 8MB Real 3D Starfighter I740 AGP graphics adapter, a 12MB Diamond Monster 3D II accelerator, and Advent AV390PL Powered Partner speakers with subwoofer.—BB

Golden Gavel Award

"One of the coolest accessory packages anyone has ever seen... Outstanding and fun."
John Dvorak
PC Magazine

WINNER



Upgraded calculators with extra financial and scientific functions plus printable paper tape registers • Adds permanent shredding to Windows so sensitive files can't be deleted • Securely protects files in an encrypted desktop Vault • View and organize thousands of images with the Picture Explorer • Broadcast-quality show maker with 60 frame-per-second effects, music, narration and sound effects • Customizable weekly, monthly and yearly photo calendars with reminders • Four new alarm clocks that precisely set your PC's time to the Atomic Clock via the Internet • Advanced CD Player with a built-in database of over 125,000 CD titles • 3D Solitaire and five new card games plus Internet multi-player ability • Amazing 3D animated screen savers • And much, much more!

Gizmos98



Simsoft, Performsoft and their logos are trademarks of Play Incorporated. Windows is a registered trademark of Microsoft Corporation. Copyright © 1998 Play Incorporated. All rights reserved.

ity graphics and video.

In *Titanic: Challenge of Discovery*, you play the role of an expedition leader on a series of missions. Using accurate renderings of the shipwreck sites where Ballard and his crews discovered the ancient Roman vessel *Isis*, the WWII German battleship *Bismarck*, and finally the *Titanic*, the game teaches people-management, research skills, history, and oceanography.

It also gives you a chance to operate realistic and technically accurate simulations of the specialty equipment used in underwater exploration.

You can run this game on a fairly low-end 120-MHz Pentium system with just 16MB of RAM and a 2MB video card, but when you use it with a well-stocked PC, particularly with hardware 3-D graphics acceleration, the experience is height-



ened considerably.

The benefits of a powerful PC emerge when you monitor remote and human-operated submersible equipment searching the ocean depths. The real-time 3-D visual effects, accompanied by realistic audio, vividly capture the underwater experience. The video sequences and graphic renderings of land and ship scenes are impressive, but the underwater visual effects are the real payoff with this game.

Tom Clancy's Rainbow Six

Tired of first-person shooters where you run through mazes blasting at everything that moves? Tom Clancy's *Rainbow Six*



Six combines strategy and first-person gaming with great graphics.

As the leader of an antiterrorist unit, you must successfully complete a series of 16 missions. For each, you choose the members of your assault team and select weaponry and equipment. The specific battle plan is mapped out for the first 4 missions (including the rules of operation), but you are on your own planning the remaining 12 sorties. Artificial intelligence controls the actions and movements of the other members of your team and of your terrorist objectives.

Your first reaction may be to get on with the game and shortcut the essential planning, but that way leads to defeat. After extensive planning, you commence your missions, where the game's high-powered 3-D graphics pay off. Movement is smooth, sound effects are realistic, and the background music adds to the suspense.

The minimum configuration is a 166-MHz Pentium system with 16MB of RAM and 1MB video memory, hardware graphics acceleration, and a 4X CD-ROM drive, with approximately 100MB of disk space allotted for a minimal installation with



saved game files, but that kind of setup will keep you waiting. The recommended system is at least a 200-MHz Pentium MMX PC with 32MB of RAM and Direct3D-compatible graphics acceleration, using 329MB of hard disk space for a maximum installation of game elements, with another 40MB to 50MB for saved files.

A fairly difficult game, *Rainbow Six* rewards your time and effort with a high degree of realism and involvement.

World Cup 98

Here's a sports title with graphics and audio so realistic that casual passersby will be convinced they are watching an international soccer game—that is, if the game is being played on a speedy PC.

World Cup 98 lets you choose from the 32 national teams that competed in this year's tournament, held in

France. Games can be played in any of ten stadiums, using the real two-stage tournament format. The game play is fast and flexible, with a wide variety of realistic moves and fakes. Practice mode lets you work on your skills, but the excitement builds quickly during matches.

More than 850 play-



er movements captured from U.S. professional soccer players are included in the game, along with savvy goalies. You can lower the speed of the game as you learn the moves, then crank it up as you gain expertise. Audio play-by-play commentary adds realism. New in this version of the game are team management and strategy options, for those who want to go beyond simple run/pass/run/shoot soccer.

A relatively paltry 100-MHz Pentium PC with 16MB of RAM, a 1MB PCI or AGP graphics card with a DirectDraw

5.0 driver, a 4X CD-ROM drive, and an audio card with a DirectX-compatible driver is all you need to run the game, but a 166-MHz PC with 32MB of RAM, an 8X CD-ROM drive, and a 3Dfx

or PowerVR 3-D graphics accelerator brings the game to life. And once you've played the game with graphics acceleration, you'll agree that's it's the only way to go. To speed up game play, it's advisable to do a full install, requiring 20MB of hard disk space.

With country-specific crowd chants, players recognizable to soccer fans, and uncannily realistic body movements, this is one PC game that's as much fun to watch as it is to play.

LEXAR
Media™

Lexar digital film records photos faster than any other film card – up to 300% faster (and yes we can prove it in one of those silly charts).

Thanks to our guys in white lab coats, Lexar film has been thoroughly tested and is guaranteed to work just dandy with any digital camera.



Yup, a zillion, trillion, billion high resolution photos. That's what you get with the highest capacity card on the market – a honkin' 64 MB film pack that lasts forever.

Now that you're into digital photography – take the film out of your digital camera, download your pictures to your PC and edit out those love handles from your beach vacation photos.

It's what makes digital cameras GO.

Just like the film you need for a 35mm camera, digital cameras require "digital film" to save and store pictures. But not all digital film is created equal. Lexar is the only digital

film that delivers a high octane boost to your digital camera. That means when it's "Loaded with Lexar," you have the speed and power to catch all the action.



Lexar Media has been tested in virtually every digital camera on the market including: • Agfa • Canon • Casio • Epson • Fuji • Hewlett Packard • Kodak • Konica • Minolta • Mitsubishi • Nikon • Olympus • Panasonic • Polaroid • Ricoh • Samsung • Sanyo • Toshiba • Vivitar • Yashica

4x, 10x, and Media are registered trademarks of Lexar Media. All other trademarks and logos are the property of their respective owners.

Choose 053 at www.pcmag.com/infolink

EARLY LEARNING

Love Those Blues

By Jennifer Triverio

Though she may not be as familiar to you as your childhood favorites Big Bird and Cookie Monster, the beloved spotted dog Blue (of Nickelodeon's television show "Blue's Clues") may well be at the top of your youngster's list. Blue takes center stage in two games from Humongous Entertainment, *Blue's Birthday Adventure* and *Blue's ABC Time Activities*.

The animated canine and her live-action friend Steve are the stars of *Blue's Birthday Adventure*. Blue, Steve, Tickety Tock, Slippery Soap, Baby Bear, and the rest of Blue's friends are all preparing to celebrate her birthday. Your child can help select the presents, bake the cake, and most important, find the clues

that Blue has hidden throughout her house and yard.

The game comes on two CD-ROMs, each of which follows a different path to the final outcome: a huge party for Blue. The red disk asks, "What does Blue want to do and play at her party?", while the yellow disk

focuses on what Blue wants to give her guests and what she wants to eat at her party.

There are nine learning activities and four creativity games on the disks, which can be played at a beginning, intermediate, or advanced level. Our kid testers loved every minute of it, giggling and squealing every time Blue

appeared on-screen. Their one quibble: They wanted to see Steve more often.

Blue's ABC Time Activities tackles letter recognition, phonics, rhyming, and word formation through seven activities that your 3- to 6-year-old enjoys with Blue. Starting in Blue's living room, kids can click on any of the characters, such as Pail

and Shovel, to launch an activity such as Safari Snapshot, Alphabet Maze, or Bathtime Rhymes.

The goal is to complete each activity successfully and earn letters, which are then strung together to form simple words. The words are used to create *Blue's Word Book*, a little storybook that can be printed out (it's great for coloring).

The variable skill levels make this title a winner for helping children master the all-important ABC's.



SPACE COMBAT

Cosmic Combat

By Michael E. Ryan

Few games on the market can compare with *Independence War* in terms of the complexity and sheer depth of game play. This epic space combat simulation can be confusing at first, and you will have to work at learning the game's many intricacies, but the effort pays off.

Independence War requires a Pentium/90 (or a Pentium/166 for 3Dfx mode) with 32MB of RAM. Though you'll see better performance from a better configuration, the game runs very well even on modestly equipped machines. The graphics in the game are spectacular—with a 3Dfx Voodoo or Voodoo2 card installed, the best we've experienced in a space combat game.

The game puts you in the role of a young starship commander serving in the Common-

wealth Navy. As the commander of a small, heavily armed spacecraft, you assume the role of captain, pilot, gunner, and chief

engineer, guiding your ship through more than 40 missions.

Your adversary is the Independent Fleet, a renegade group of revolutionaries bent on overthrowing the Commonwealth. As you progress through the game, a rich story line develops, in

which you learn quite a bit more about the conflict and the ship you command.

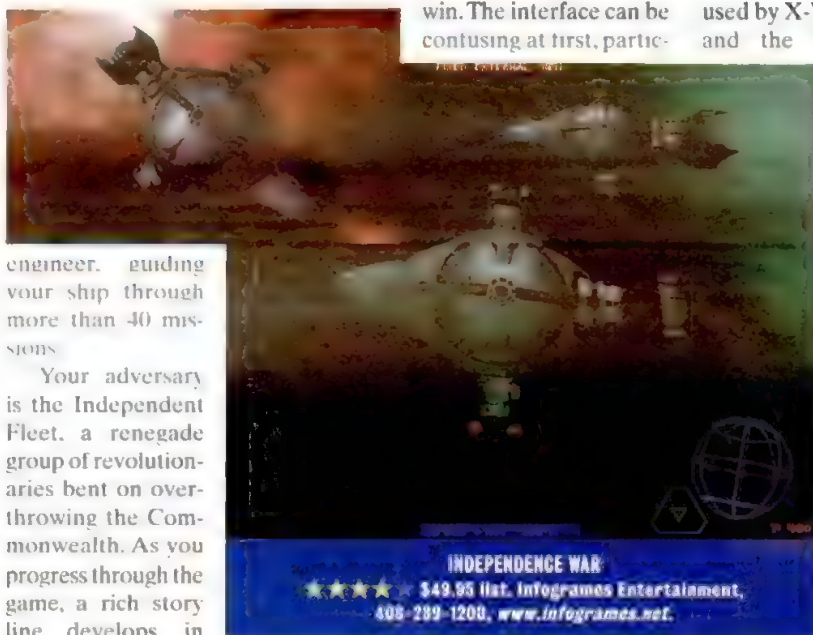
The game is quite challenging, and you will have to rely on your puzzle-solving skills as well as your piloting prowess to win. The interface can be

confusing at first, partic-

ularly the piloting and gunnery displays. The commands will take several hours to master. Additionally, you may be hard-

pressed to master the feel of your starship. Instead of the "airplane in space" flight model used by *X-Wing* vs. *TIE Fighter* and the *Wing Commander* games, *Independence War* presents a somewhat more realistic take on space travel—one in which inertia and other factors play a key role.

Independence War is certainly one of the best-developed games we've ever seen. Although it may prove too complex for casual game players, hard-core players should find a lot to like in this title.

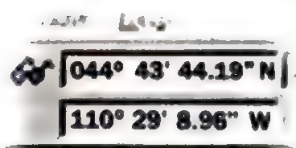


Know all the ups and downs of a National Park before you even set foot in it.

Introducing Maptech® National Park Digital Guides

It's like having a Park Ranger at your elbow, helping you plan your trip.

Simply pop a CD-ROM in your PC or laptop.



Automatically displays coordinates of your position

And up come maps, easy-to-use navigation software and a fact-filled "electronic guidebook."

By pointing-and-clicking, you can plot a course.

Figure out where to stay. Learn about the park's attractions, trails, local geology, wildlife – and a whole lot more.

The maps include an official National Park Map – but it's combined with detailed, topographic maps from the U.S. Geological Survey. So, you see *exactly* how the land lies.

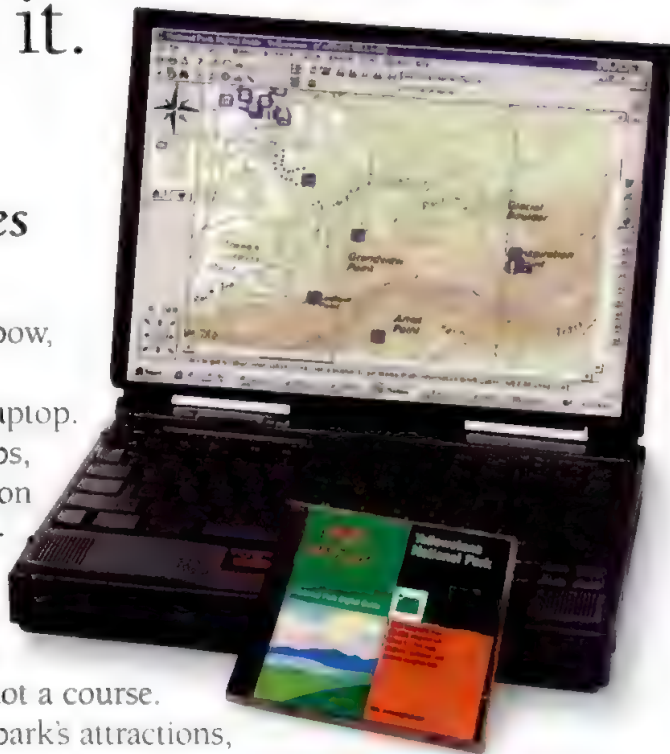
And there's a special edition of Maptech's Terrain Navigator software that lets you:

- Measure distances and elevations
- Zoom in four levels for "closeups"
- Print out customized maps to take with you

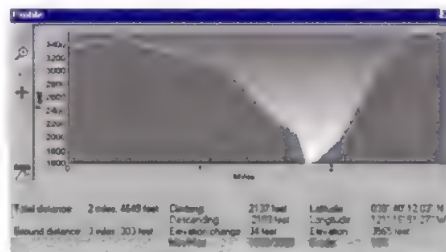
Want more out of your park trip? *This* is the place to begin!

If you'd like to know more about Maptech products, and get a free demo, visit our website, at www.maptech.com

Only \$29.50 for each park, \$69.50 for a region, \$179.50 for all 54 National Parks. Available from the Lands' End® catalog, or from Maptech.



Call up photos of attractions



Elevation profile lets you check "line-of-sight" to landmarks

For a free demo, go to www.maptech.com

Or, for more information, mail this coupon or fax it to: 1-603-433-8505.

To place an order, call: **1-800-627-7236**

PC1298

Name

Address

City State Zip

Phone () Day / Night (circle one)

E-mail

Maptech, Inc.
655 Portsmouth Avenue,
Greenland, NH 03840
© 1998 Maptech, Inc


MAPTECH®

HOME STUDY

Word Play

By Jennifer Triverio

That fifth-grade Spanish class you took all those years ago doesn't help too much when you're traveling in Mexico and need to ask for the route back to your hotel. Luckily, there's software to help point you in the right direction. Spanish for the Real World and French for the Real World, from the combined efforts of Knowledge Adventure and Kaplan Educational Centers, focus on conversational skills for first-year students.

Though the interface—the dashboard of a car tooling through the streets of Mexico or France—is geared to the preteen to teenage crowd, the programs



actually have something to offer us older folks as well. Be aware, though, that these programs teach through a combination of arcade-style games and activities; if you're looking for straightforward drills and lessons, you'll

have to look elsewhere.

Because the object is to learn how to speak a language, the disks dive right in with instructions, clues, and general commentary spoken in either Spanish or French. Though you won't understand every word, the idea is to get a feel for the language. You begin as a contestant in a road rally, racing against a host of other cars. To pass them and win the race, you must defeat them in each of six skill challenges: matching pictures of fruit to their names, for example. After each drill, there's a real-world scenario for you to practice what you've learned. After the matching game, for instance, you go to an open-air market and purchase fruit from a grocery list you're given.



Other areas of concentration include days of the week, driving directions, and purchasing items in a store or restaurant. You can stop an activity at any time to work on some practice drills or peruse the dictionary.

Although these programs do not focus on sentence structure or the written language, they give you a solid overview of the spoken language and ensure that you'll be able to play the part of the confused tourist with flair. **PL**

Coming Up

What's in the Next Issue of *PC Magazine*

Technical Excellence

Following our 15th annual event at Fall Comdex in Las Vegas, we'll publish summaries about the winners and runners-up in our PC Magazine Awards for Technical Excellence program. *PC Magazine's* editorial and labs staffs as well as our contributing editors debate for a couple of months, then vote to determine the winners in more than a dozen categories.

Home PCs

To coincide with the holiday buying season, we'll review more than 20 home PCs, paying careful attention to multimedia, Internet connectivity, and ease of use. Representing 15 of the industry's leading direct and retail vendors, these Microsoft Windows 98 systems will be divided into two major categories: low-end and high-end machines.

V.90 Modems

With the V.90 code approved, 56K modem vendors finally have a universal standard to follow. Modem makers are updating their old lines to the standard and releasing new modems with native V.90 support. Next month, we'll test the product lines from ten leading vendors to see how modems built on the new V.90 standard perform.



ZD INC.

Chairman and CEO Eric Hippeau

Chief Financial Officer Timothy O'Brien

Presidents Bob Brown (ZD Market Intelligence), Jason Chudnofsky (ZD Comdex and Forums), Terri Holbrooke (ZD Brand and Market Services), Dan Rosensweig (ZD Internet Productions), William Rosenthal (ZD Education), Claude P. Sheer (ZD Publishing), Larry W. Wangberg (ZD Television) **Senior Vice Presidents** Rayna Brown, J. Malcolm Morris, Daryl R. Otte **Vice Presidents** Marylou Berk, Steve Gladyszewski, Mark Moyer, Tracy Nedi **Treasurer** Thomas L. Wright **Executive Vice President** Joe Gillespie (Corporate Sales)

ZD Media Network

Executive Directors Jeff Bruce, Rita Burke, Scott Murphy

ZD Brand & Market Services

Vice Presidents Brooke Correll, Michael Perkowski, Herb Stern, Eida Vale **Director, Corporate Communications** Gregory Jarboe

ZD Publishing

President Claude P. Sheer **Executive Vice Presidents** Don Byrnes, Chris Dobbrow, Jack Dolce, Al DiGuido, Thomas McGrade **Executive Vice President and Editorial Director, ZD Publishing** Michael J. Miller **Senior Vice President** Nancy Newman **Vice Presidents** Bob Bader, John Dodge, Kathleen Goodwin, Roger Hermann, Jonathan Lane, Eric Lundquist, Bill Machrone, Jim Manning, Charles Mast, James F. Rameley, Paul Somerson, Mark Van Nema **Executive Director, Licensing** Gertrud Borchardt **Director, ZD Benchmark Operation** Eric Hale **Director, ZD Labs** Lauren Black

PC Magazine, ISSN 0898-9507, is published twice a month except in July and August at \$49.97 for one year. Ziff Davis Inc., One Park Ave., New York, NY 10016-5802. Periodicals postage paid at New York, NY 10016-5802 and at additional mailing offices. POSTMASTER: Address changes to *PC Magazine*, P.O. Box 54093, Boulder, CO 80328-4093. The Canadian GST registration number is 14048 8720 RT. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 265477. Printed in the U.S.A.

Think Ink!



Hewlett Packard. Always Clear. Always Sharp.



Wal-Mart's Electronic Department has Hewlett Packard ink cartridges and printing accessories available for all your holiday printing needs. And they're at our Every Day Low Price. Now that's something to think about.



WAL★MART
ALWAYS LOW PRICES.

Always.





Introducing the award-winning AcerView F31 LCD Monitor. Its advanced, stylized design gives you a sharper picture with 73% less footprint on your desktop than standard CRTs. That will open up vast new realms of uncharted space on your desk. And Acer is one of a few companies that can plant its flag on a monitor—and truthfully say they built it. To discover more about the impressive line of AcerView LCD monitors, call 1-800-379-2237 ext.123 or go to www.acerperipherals.com.

Acer 
Monitors

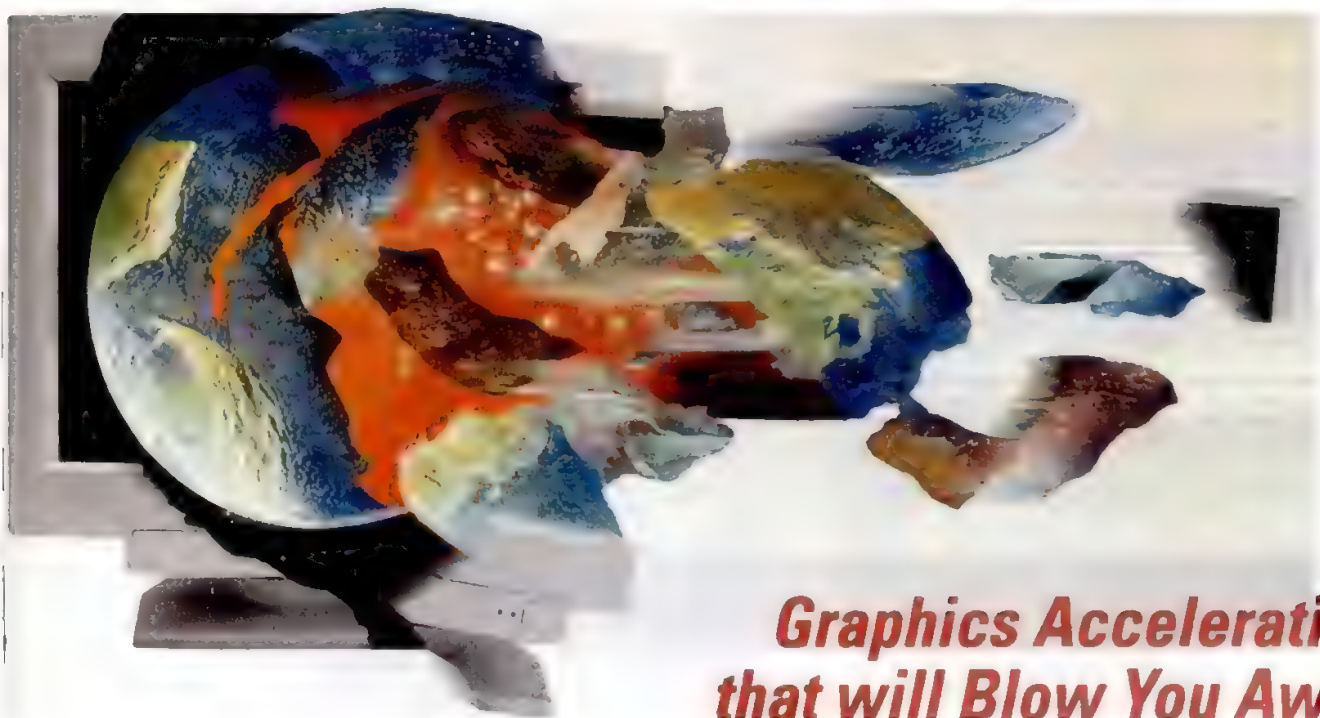
One small footprint for man,
ONE GIANT LEAP for MONITORS.



COMP USA
The Computer Store



ERAZOR II



**Graphics Acceleration
that will Blow You Away**

Propelled by the raw power of the NVIDIA RIVA TNT (Twin-Texel) 128-bit 3D processor, the extreme limits of application and entertainment graphics are surpassed.

ELSA ERAZOR II provides enough of both to give you the best performance whether you are working or playing. ELSA ERAZOR II features:

- Explosive 3D Features
- Dynamite 2D Performance
- Thundering 8 or 16MB Memory
- Power Packed Single Board Solution

ELSA ERAZOR II, the 3D/2D graphics accelerator that will blow your PC into performance zones that you could only dream of in the past. The Direct3D acceleration is pumped out by the single pass multi-texture processing unit exploding through up to 16MB of memory delivering the ultimate in graphics power.

Windows® 95, Windows® 98, Windows NT® 3.5, 4.0 and 5.0 display drivers

OpenGL® (Installable-client driver), Direct Draw, Direct3D™, DirectVideo, ActiveX, DirectX™ and PC98 compatible

Choose 232 at www.pcmag.com/infoclink

ELSA Inc. • 800-810-0100 • E-mail: (800) 810-0100 •@... ..

Quake II PERFORMANCE

ELSA ERAZOR™ II / 80.4

STB VELOCITY 128™ / 43.3

Matrox Millennium™ G200 / 42



Call ELSA toll free at
1-800-560-2990





My PC's having an identity crisis.
It thinks it's my stereo system.



My PC used to just run. Now it does the tango, salsa and cha-cha-cha. It conquers game-villains with arcade-like 3-D sound and plays CDs that have me swaying like a symphony. There's always been music in my computer. I just realized how to get it out. USB Digital Speakers. No sound card. No manuals. No rebooting. Just pure, digital sound without the installation hassle. For more



PHILIPS

Let's make things better.

If it weren't for **Family Tree Maker**, I would never have found my family



Using Family Tree Maker, Diana found her great-great grandparents
Hannah & William Hunt Wilson.

The Easiest & Most Complete Resource for Building Your Family Tree

Dear Family Tree Maker,

I became interested in genealogy because I never knew my ethnic heritage. The only ancestor name and location I knew of was that of my great-great grandfather, William Hunt Wilson who lived in Oregon.

I then decided to purchase a genealogy program, and chose **Family Tree Maker** because of the **FamilyFinder™** Index. I went home, loaded the program, did a search in the FamilyFinder Index using my great-great grandfather's name, and it referenced a World Family Tree™ CD*. I couldn't believe my eyes!

I found the name "William Hunt Wilson" on the CD. The family tree was huge — hundreds of names! My name was not there, so I decided to contact the tree's contributor to let her know that I found the connection. I left a message, and that night, I received the long-awaited call. The contributor, who is also my cousin, was screaming on the phone because she could not believe she had found me. I was part of a "long lost leg" that the family had not heard of for over 50 years! We laughed, we cried, and talked all night. And now, we have contact every day — either by phone or by email.

A family reunion is scheduled to take place this Fall, thanks to **Family Tree Maker**. I never would have found my family if it weren't for the program.

Thank you!

Diana Gasher
San Jose, CA

FIND ANCESTORS GUARANTEED

- FamilyFinder Index tells you exactly where to find information on your family
- World Family Tree links people tracing the same family lines
- Electronic "agents" search the Internet and send email when they find leads
- Display results in professional quality family trees, family books, and reports

AWARDS WON!



Awards won by Family Tree Maker™ Deluxe Edition III, the previous version.



SOURCE CODE 629028A

Broderbund

* The World Family Tree CDs contain actual family trees. Contributor information is available free upon request. Family Tree Maker is available for Windows 95 and Power Macintosh. Features vary according to platform and price. Additional accessory CDs sold separately. ©1998 Broderbund Software, Inc. All products are trademarks of their respective holders.

Choose 347 at www.pcmag.com/infolink

Call us at 1-800-315-0669 or visit www.familytreemaker.com/pcmag



DeluxScan Technology Is Bringing Nature To Life

Technology has always been the driving force behind innovation. And at Hyundai, we believe its ultimate goal is to help bring nature back into modern life. Our DeluxScan monitors are a perfect example. This display family is designed to maximize your valuable desk space. We started by adopting reduced depth CRTs in our 17 and 19-inch monitors, delivering some of the smallest footprints available.

Now we've taken our ergonomic and environmental technology to the next level with high-performance 12 to 15-inch LCD monitors. Boasting a smaller-than-office-phone footprint, flicker and radiation free display, wide viewing angle, convenient controls, and a peak power consumption of just 30 watts, these new DeluxScan LCD monitors embody our commitment to bringing natural, quality-of-life enhancing technologies to your desktop.



DELUXSCAN®

pinacor
800-PINACOR

TechData
800-2378931

MERISEL
800-MERISEL

PANTEX
713-988-1688

empowering technology for tomorrow
HYUNDAI

Headquarter (Hyundai Electronics Industries Co. Ltd) San 136-1, Ami-Ri, Bubal-Eub, Ichon-Si, Kyunggi-Do, Korea Tel: 82-336-630-3826 Fax: 82-336-636-4231
Hyundai Electronics America Tel: 800-568-0060 Fax: 408-232-8146 <http://www.hei.co.kr>

Choose 060 at www.pcmag.com/infolink

Look Out, It's Loaded.

- **Intel® Pentium® II Processor 300 MHz**
The fastest mobile processor you can buy
- **14.1" XGA Active Matrix Color Display**
For dazzling graphics and easy viewing
- **128 MB Fast SDRAM**
Work faster and run multiple applications at once
- **ATI Rage LT Pro 3-D Graphics Accelerator**
Get faster video, smoother DVD and 3-D effects
- **LS-120 SuperDisk™ Disk Drive**
*Backup on the road with a 120 MB SuperDisk™ Diskette
Reads standard floppy disks— it's two drives-in-one*
- **2nd Generation DVD/CD-ROM Drive**
Play DVD movies, games and get ready for the future
- **1 1/2" thick and only 7 lbs. w/battery**
*Lightest and thinnest all-in-one notebook
Up to 25% lighter than similarly configured notebooks*



Features:*	Compaq Armada 7800	Dell Inspiron 7000	Toshiba Tecra 8008	IBM Thinkpad 770X	WinBook XL2
Processor	300 MHz	300 MHz	300 MHz	300 MHz	300 MHz
Display	14.1"	14.1"	14.1"	14.1"	14.1"
AGP Graphics	•	•	•	•	•
RAM	128 MB	128 MB	128 MB	128 MB	128 MB
Modem	56 k	56 k	56 k	56 k	56 k
Hard Drive	8 GB	6.4 GB	8 GB	8.1 GB	6 GB
DVD-ROM Drive	•	•	•	•	•
LS-120 SuperDisk™ Drive	•			•	•
All Drives Built-In		•			•
Touchpad		•			•
Pointing Stick	•		•	•	•
Price	\$6149	\$3696	\$4937	\$5601	\$3199

*Chart information based on 10/9/98 audit of www.dell.com, www.microwarehouse.com, www.cdw.com, www.technologydirect.com, www.compactdirectplus.com, and www.compusadirect.com.

\$3199

Whoever said you can't have it all was wrong! The new WinBook XL² proves it with the most complete set of features in the notebook industry. Compare the XL² to any notebook at any price and you'll see what a value this new top-of-the-line notebook is.

WinBook notebooks are "Critically Proven" with over 160 industry awards for design, performance and value.

For more information or to order your XL² today, visit www.winbook.com or call 800-339-4759.

800-339-4759

WinBook

Critically Proven.

Winner of over 160 awards
www.winbook.com

©1998 WinBook Computer Corporation. All rights reserved. WinBook is a registered trademark of Micro Electronics, Inc. The Intel Inside logo and Pentium are registered trademarks and MMX is a trademark of the Intel Corporation. All other trademarks and registered trademarks are property of their respective corporations. All prices and specifications are subject to change without notice or obligation. Prices do not include shipping.

Chooses 085 at www.pcmag.com/infolink

Product Company	Page No./Infolink	Product Company	Page No./Infolink
Aberdeen Inverness D50 Aberdeen LLC	122/500	Micro Express MicroFlex-K6-2/Pro Micro Express	127/525
AcerPower 8000 Acer America Corp.	162/501	Micron ClientPro 350 Micron Electronics Inc.	183/526
ACMA nPower 6333 ACMA Computers Corp.	162/502	Micron ClientPro 450 Micron Electronics Inc.	183/526
ACMA nPower 6400 ACMA Computers Corp.	162/502	Micron Millennia 450 MAX Micron Electronics Inc.	130/526
ACT Brillianta P611-400HC All Computer Technology	162/503	Microsoft SMS 2.0, Beta 2 Microsoft Corp.	286/902
ACT Brillianta P611-400MC All Computer Technology	162/503	MidWest Micro Business Solutions WKP-350 MidWest Micro	186/527
ACT Brillianta P611-400PE All Computer Technology	122/503	MidWest Micro Business Solutions WKP-400 MidWest Micro	186/527
Adobe Illustrator 8.0 Adobe Systems Inc.	52/419	MidWest Micro Multimedia Pro 450 MidWest Micro	130/527
American Multisystems InfoGold P11400 American Microsystems	123/504	MultiTech MultiModem USB MultiTech Systems Inc.	75/401
Axis Metropolis GX5 400 Axis Systems	162/505	NEC Direction SP E450 NEC Computer Systems Division	130/528
Axis Metropolis NX5 300 Axis Systems	162/505	NEC MobilePro 780 NEC Electronics	41/428
Axis Orion 100X DVD 400 Axis Systems	123/505	NEC MobilePro 800 NEC Electronics	41/428
BioStar Crux 390 BioStar Group	244/550	NEC PowerMate 8100 NEC Computer Systems Division	186/528
Canopus Spectra 2500 Canopus Corp.	244/551	NEC PowerMate Enterprise 8000 NEC Computer Systems Division	186/528
C-it PC Camera Model XVP-510 Xirlink Inc.	61/416	NETIS Professional BestBuy NETIS Technology Inc.	130/529
Compaq Deskpro EN 350 Compaq Computer Corp.	163/	nextPC 350MP nextPC	130/530
Compaq Deskpro EN 450 Compaq Computer Corp.	163/	NexTrend NexStar-400PCP NexTrend Technology Inc.	130/531
Compaq Deskpro EP Compaq Computer Corp.	123/	NexTrend NexStar-450MP NexTrend Technology Inc.	190/531
Compaq Microcom 705 Corporate Communicator Compaq Computer Corp.	76/	Norton 2000 Corporate Edition Symantec Corp.	66/411
CompUSA PC American Pro AP450L-SE CompUSA	123/507	Number Nine Revolution IV 32MB Number Nine Visual Technology	269/562
Comtrade Professional 400 Comtrade	163/506	Number Nine Savage Reality 357 Number Nine Visual Technology	269/562
Creative Graphics Blaster Riva TNT Creative Labs Inc.	251/552	Polywell Poly 800B5 Polywell Computers Inc.	190/532
CyberMax Home Theater CyberMax Computer Inc.	123/508	Polywell Poly 8450BU Polywell Computers Inc.	130/532
Dell Dimension XPS R450 Dell Computer Corp.	123/509	Peser 3 MetaCreations Corp.	64/406
Dell OptiPlex GX1 Dell Computer Corp.	163/509	Premio Apollo BX400 Premio Computer Inc.	130/533
Dell OptiPlex GX1p Dell Computer Corp.	163/509	Printable Expressions Greeting Card Collections Hewlett-Packard Co.	51/429
Diamond Monster Fusion Diamond Multimedia Systems Inc.	252/553	ProGen Discover MPEGII P11450 ProGen Systems	130/534
Diamond Viper V550 Diamond Multimedia Systems Inc.	252/553	ProGen P11 350 ProGen Systems	190/534
DMI Thunder II DMI Computer Technologies	126/510	ProGen Polaris P11 450 ProGen Systems	190/534
DTK APRI-76M/P256 DTK Computer Inc.	166/511	ProLink 3D Combo plus ProLink Computer Inc.	269/563
DTK APRI-80M/P350 DTK Computer Inc.	166/511	Proside Trinosaw PRS-MP6000 Proside Corp.	271/564
DTK APRI-80M/P450 DTK Computer Inc.	126/511	Quantex Microsystems QP6/450 SM-4x SE Quantex Microsystems Inc.	130/535
Duracom ProForma 6221 Duracom Computer Systems Inc.	166/512	Quantex QP6/350 SB-3 Quantex Microsystems Inc.	195/535
Duracom ProForma 6301 Duracom Computer Systems Inc.	166/512	Quantex QP6/450 SB-5 Quantex Microsystems Inc.	195/535
ELSA Erazor II ELSA Inc.	257/554	Quantum3D Raven Quantum3D Inc.	271/565
ELSA Victory II ELSA Inc.	257/554	Racer Talladega 400 Racer Computer Corp.	130/536
FileMaker Pro 4.1 FileMaker Inc.	48/431	Real 3DStarFighter Real 3D Inc.	273/566
Gateway E-3200 400 Gateway	166/513	Reason Square 1 BX/A Reason Computer	195/537
Gateway E-4200 450 Gateway	166/513	Reason Square 6 BX/JN Reason Computer	195/537
Gateway G6-450 Gateway	126/513	Royal Exciting Professional Royal Computer	134/538
Great Magic Machspeed Raptor 740 Great Magic Technology Inc.	257/555	Royal Power Desktop Royal Computer	195/538
GST Celestial Storm 333N GST/Micro City Inc.	167/514	SAG STA Dual Power Station SAG Electronics	134/539
GST Celestial Storm 400N GST/Micro City Inc.	167/514	SAG STA Dual Power System 300 SAG Electronics	195/539
Guillemot Maxi Gamer Phoenix Guillemot Corp.	260/556	SAG STA Dual Power System 400 SAG Electronics	195/539
Hercules Terminator Beast T9318SD Hercules Computer Technology Inc.	260/557	Seagate Desktop Management Suite 3.0 Seagate Software Inc.	288/903
Hercules Terminator Beast T9328SG Hercules Computer Technology Inc.	260/557	Sharp Mobilon TriPad Sharp Electronics Corp.	41/422
Hertz P11 400 Hertz Computer Corp.	127/515	Sony GDM-F500 Sony Electronics	66/410
Highwave Scorpion 400 Highwave Technologies Inc.	167/518	STB Nitro 3200 STB Systems Inc.	273/567
Highwave Tercel 300 Highwave Technologies Inc.	167/518	STB Velocity 4400 STB Systems Inc.	273/567
HiQ Impact Elite HiQ Computer Systems	167/519	Sys Performance Pro 400BA Sys Technology Inc.	198/540
HiQ Impact Pro HiQ Computer Systems	167/519	Sys Performance Pro 450 Sys Technology Inc.	198/540
HiQ Impact 2000 HiQ Computer Systems	127/519	Sys Performance Pro 450BADD-R1 Sys Technology Inc.	134/540
HoTMetal PRO 5.0 SoftQuad Inc.	56/412	Tagram Platinum T5300 Tagram System Corp.	198/541
HP Jornada 820 Hewlett-Packard Co.	41/421	Tagram Platinum T5700 Tagram System Corp.	198/541
HP Vectra VE Series 8 Hewlett-Packard Co.	167/516	Tagram Thunderbolt H2750 Tagram Systems Corp.	134/541
HP Vectra VL Series 8 HE Hewlett-Packard Co.	167/516	Tangent Medallion 450X Tangent Computer Inc.	134/542
IBM Netfinity 7000 M10 IBM Corp.	75/400	Tangent Medallion BX 300 Tangent Computer Inc.	198/542
IBM PC 300PL (400) IBM Corp.	176/520	Tangent Medallion BX 400 Tangent Computer Inc.	198/542
IBM PC 300PL (450) IBM Corp.	176/520	Tiger K-Series 333 3D Plus TigerDirect Inc.	134/543
IBM ThinkPad 560Z Model BOU IBM Corp.	60/414	Toshiba Equium 7000S Toshiba America Information Systems Inc.	198/544
IBM ThinkPad 770X Model 7AU IBM Corp.	60/414	Toshiba Equium 7100D Toshiba America Information Systems Inc.	198/544
Image Expert CE Sierra Imaging Inc.	41/424	Toshiba Libretto 70CT Toshiba America Information Systems Inc.	41/426
Initiative Technology ITI-PCE400 Initiative Technology Inc.	127/521	Toshiba Portégé 3010CT Toshiba America Information Systems Inc.	61/415
Intel Express3D Intel Corp.	260/558	Total Peripherals Serengeti BX350 Total Peripherals Inc.	198/545
Intel ProShare Video System 500 Intel Corp.	77/403	Total Peripherals Serengeti 400 Total Peripherals Inc.	134/545
Kingdom Pinnacle K6-II 3D 300 Kingdom Computers	127/522	Unicent Avanta L300 Unicent Technologies Inc.	198/546
LANDesk Management Suite 6.1 Intel Corp.	280/900	Unicent Extreme Z300 3D Unicent Technologies Inc.	134/546
Leadtek WinFast 3D S320 Leadtek Research Inc.	265/559	Unitek Tailwind UT-P11400 Unitek Technology Inc.	134/547
Lexmark Photo Jetprinter 5770 Lexmark International Inc.	51/430	Vadem Clia Vadem	41/423
LG Phenom Express LG Electronics	41/427	VirusScan 4.0 Network Associates Inc.	56/413
Mabango 2.0 Digital Graffiti Inc.	64/407	VoiceCrypt 2.01 Veritel Corp.	73/408
ManageWise 2.6 Novell Inc.	282/901	WatchGuard Security System v3.1	
Matrox Marvel G200-TV Matrox Graphics Inc.	265/560	with Firebox II WatchGuard Technologies Inc.	76/402
Matrox Millennium G200 Matrox Graphics Inc.	265/560	Winbook XL 233/16 WinBook Corp.	41/425
Maximus Executive Workstation Maximus Computers Inc.	177/523	WinZip 7.0 Nico Mak Computing	52/420
Maximus Powerman Workstation Maximus Computers Inc.	177/523	Xi 400 MTower CSP Xi Computer Corp.	198/548
Maximus PowerMax DVD P450XP Maximus Computers Inc.	127/523	Xi 400 MTower GSP Xi Computer Corp.	134/548
Mega Impact P11 333 64MX Mega Computer Systems	182/524	Xi 400 MTower SP Xi Computer Corp.	198/548
Mega Impact P11 400 128MX Mega Computer Systems	182/524	Zenon Dream Media Pro Zenon Computer Inc.	134/549
Mega Impact P11400 128ProFMX Mega Computer Systems	127/524	Zenon Z-Corp Zenon Computer Inc.	198/549
Megabyte Wicked3D Vengeance Metabyte Inc.	267/561	Z.E.N.works 1.0 Novell Inc.	282/901
MemberSites Interactive Toaster Company Inc.	73/409	Zykel Prestige 100MH Router/Hub/Modem Zykel Communications	77/404

...THE ROCKET LEAVES ITS COMPETITORS IN THE DUST.*

Hugh Bennett, EMedia Professional, December 1998

\$300 Mail-In Rebate*

On the CD Rocket 8x CD-Recorder

Good between 11/1/98 - 12/31/98

*Offer valid in U.S.A. & Canada only
(Payment in U.S. dollars)

For more details about
the rebate visit our
website!

Breaking the Speed Barrier in CD-Recorder Technology

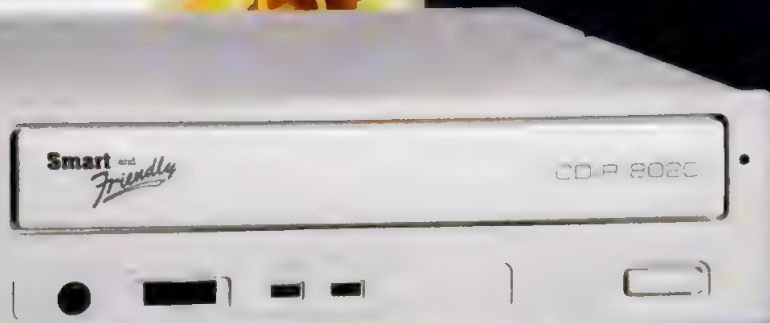


The CD Rocket 8x CD-Recorder

ONLY FROM

Smart and Friendly

- Write at 8x, Playback at 20x
- Holds up to 650MB of music, data, or video on one CD, which can be played in any standard CD-ROM drive.
- Free Software Suite included for Windows 95/98, Windows NT 4.0, and Macintosh (external model only)
- Plentiful 2MB buffer
- Make your own CDs for music, audio, data archiving and backup, digital imaging, creation of multimedia titles and corporate training videos!
- Easy to install and operate



Smart and Friendly™

Toll Free: (800) 542-8806

<http://www.smartandfriendly.com>

Smart and Friendly products are available at:

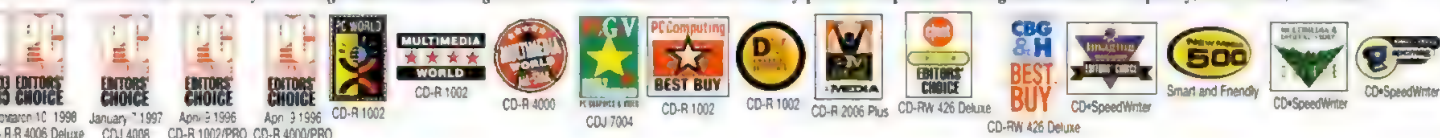
- | | | |
|---------------|----------------------|---------------------------|
| • American TV | • Fry's Electronic | • Nationwide Computers |
| • CDW | • The Good Guys | • Nebraska Furniture Mart |
| • CompUSA | • Insight Direct | • PC Connection |
| • Darnak | • J&R Computer World | • TigerDirect |
| • DataVision | • Micro Center | |
| • Fred Meyer | • Micro Warehouse | |

Choose 264 at www.pcmag.com/infotlink

Smart and Friendly is a trademark of Smart and Friendly, Inc. All other trademarks are the property of the respective holders. Specifications subject to change without notice.

Toll Free Tech Support!

These awards mean only one thing, that America's toughest critics think that Smart and Friendly products represent the highest standards in quality, ease of use, and value.



Infolink No.	Company	Product	Page
ACCELERATOR BOARDS			
077	3Dh Interactive	3D Graphics Chip Set	248-249
056	A Trend Technology	Motherboard	309
•	Diamond Multimedia Systems	Viper V550	261
232	Elsa, Inc.	3D Graphics Accelerator Boards	411
200	Gigabyte	Motherboard	339
380	Matrox Graphics, Inc.	Millennium G200	226
046	nVidia	3D Graphics Chip Set	242-243
247	STB Systems, Inc.	Velocity 4400	20
ADD-ON BOARDS			
095	Creative Labs	Sound Card and Speakers	60A-60H
•	Diamond Multimedia Systems	Viper V550	261
•	Diamond Multimedia Systems	Sonic Impact	45
200	Gigabyte	Motherboard	339
380	Matrox Graphics, Inc.	Millennium G200	226
ANTI-VIRUS SOFTWARE			
299	McAfee Software	McAfee Office	112-113
209	Panda Software	Panda AntiVirus	295
BACKUP SOFTWARE			
162	American Power Conversion	Back-UPS Line	84
283	MegaHaus	Mass Storage	357
CAD/CAM			
•	Visio	Visio IntelliCAD	235
CD-ROM			
025	Addonics Technologies Corp	Pocket DVD	343
212	ADOpen America, Inc.	CD-ROM Drive	344-345
239	Plextor	UltraPlex CD-ROM	336
284	Smart and Friendly	CD Rocket 8x CD Recorder	417
CHIPS/PROCESSORS			
•	Advanced Micro Devices	K6 3D	214-215
•	Intel Corporation	Pentium II Processor	38-39
046	nVidia	3D Graphics Chip Set	242-243
COMPUTERS/DESKTOPS			
•	AST Computers	Notebooks, Desktops, Servers	65
010	Axis Systems	Desktop Computers	359
136	BOLDdata	Systems	72
360	CDW Computer Centers, Inc.	Hardware	370-371
158	CDW Computer Centers, Inc.	Hardware	68-69
159	CDW Computer Centers, Inc.	Hardware	70-71
•	Compaq Computer Corporation	Compaq Computer Corporation	102-103
•	Compaq Computer Corporation	Compaq Computer Corporation	141-144
•	Compaq Computer Corporation	Compaq DeskPro Series	206-207
•	Compaq Computer Corporation	Compaq DeskPro Series	208-209
•	Compaq Computer Corporation	Compaq Computer Corporation	302-303
•	Compaq Works	Compaq Works	317
•	Dell Computer Corporation	Notebooks, Dimension & Servers	CS-C8
•	Dell Computer Corporation	Desktops	128-129
•	Dell Computer Corporation	Dimension, Notebooks, Servers	160-161
•	Dell Computer Corporation	Latitude, Dimension & Servers	367
•	DTK Computer	Desktop Computers	323
372	Hewlett Packard	HP Commercial PC	18-19
•	Intel Corporation	Pentium II Processor	38-39
003	Micro Warehouse	Hardware, Software, Systems	364-365
013	Micron	Micron Family of Products	169-171
098	Micron	Micron Family of Products	364-37
119	Micron	Micron Millennia	5
036	Mitac International Corp	Computer	346-347
254	Monorail	Desktops	96
155	NEC Computer Systems	NEC Workstations	178-179
047	PC Connection	Mail Order	360-361
•	PC Mail	Hardware, Software, Peripherals	368-369
174	Premio Computers	Desktop	319
287	ProGen	Desktops and Notebooks	98-99
290	Quantex Microsystems	Quantex Systems	105-110
•	S.A.G./Storage Solutions	Servers and Storage	46-47
014	Sony Direct	Sony iC Chip Recorder	146-151
014	Sony Direct	VAIO Digital Studio PC	146-151
068	Sony Electronics, Inc.	VAIO Micro Tower	54-55
388	TigerDirect	TigerDirect	423
028	U-Tron Technology	Network Solutions	8
COPIERS			
•	Hewlett Packard	Multifunction Printers	213
DATA BASE MANAGERS			
•	Oracle Corp	Oracle Designer	11
DIGITAL CAMERAS			
•	Canon USA	Canon USA - Graphic Systems	124-125
•	Hewlett Packard	HP PhotoSmart	155
053	Lexar Media	High Performance Digital Film	405
014	Sony Direct	Sony iC Chip Recorder	146-151
071	Sony Direct	Sony Mavica Camera	14
014	Sony Direct	VAIO Digital Studio	146-151
DISK/TAPE DRIVES			
025	Addonics Technologies Corp	Pocket DVD	343
•	DLTape Systems	DLT Tape Systems	67
•	Imega Corporation	Mass Storage	253-256
027	Micro Solutions Computer Products	Backpack CD-Rewriter	366
284	Smart and Friendly	CD Rocket 8x CD Recorder	417
E-COMMERCE			
•	E*TRADE	Online Investing	230-231
•	Lotus Development Corporation	Lotus Development Corporation	210-211
FAX SOFTWARE			
•	3 Com Corporation	56K Modem	164-165
•	3 Com Corporation	3Com Megahertz	274
FAX/MODEM			
•	Diamond Multimedia Systems	SupraSonic II	153
•	Hewlett Packard	Multifunction Printers	213
FINANCIAL PLANNING SOFTWARE			
•	Intuit, Inc.	Quicken	92

Infolink No.	Company	Product	Page
GENEALOGY SOFTWARE			
347	Banner Blue	Family Tree Maker	413
GRAPHICS SOFTWARE			
332	Corel Corporation	Corel WordPerfect Suite	268
243	Viagrafx	Design CAD	312
HAND-HELD PC'S			
HARD DRIVES			
212	ADOpen America, Inc.	CD-ROM Drive	344-345
•	DLTape Systems	DLT Tape Systems	67
•	Imega Corporation	Mass Storage	253-256
HARDWARE			
•	3 Com Corporation	56K Modem	164-165
•	3 Com Corporation	3Com Megahertz	274
077	3Dh Interactive	3D Graphics Chip Set	248-249
081	ACS Innovations	COMPRO Ezfone	281
235	AMS Tech	Rodeo Notebooks	53
096	Acer Peripherals America	AcerView Monitors	410
•	Altra	Altra MicroPoint	332
212	ADOpen America, Inc.	CD-ROM Drive	344-345
•	Canon Computer Systems	MultIPASS Multifunction Printers	22-23
•	Compaq Computer Corporation	Compaq Computer Corporation	144
•	Compaq Works	Compaq Works	317
095	Creative Labs	Sound Card and Speakers	60A-60H
333	D-Link Systems	Switches	283
•	Dell Computer Corporation	Notebooks, Dimension & Servers	CS-C8
•	Dell Computer Corporation	Notebooks	90-91
•	Dell Computer Corporation	Servers	12-13
•	Dell Computer Corporation	Dimension, Notebooks, Servers	160-161
•	Dell Computer Corporation	Notebooks	196-197
•	Dell Computer Corporation	Workstation	258-259
•	Dell Computer Corporation	Latitude, Dimension & Servers	367
•	Diamond Multimedia Systems	SupraSonic II	153
•	Diamond Multimedia Systems	Viper V550	261
•	Diamond Multimedia Systems	Sonic Impact	45
083	Digital Persona	U are U	421
•	DLTape Systems	DLT Tape Systems	67
232	Eisa, Inc.	3D Graphics Accelerator Boards	411
005	Epson America	EPSON Stylus Color Printers	233
004	Epson America	EPSON PowerLite 5500C	50
•	Gateway	Notebooks, PCs, Mail Order, Peripherals	484-48L
082	Genicom	Printers	321
•	Hewlett Packard	HP Color Printers	130-137
•	Hewlett Packard	HP PhotoSmart	155
•	Hewlett Packard	HP PhotoSmart	157
•	Hewlett Packard	HP Commercial PC	18-19
•	Hewlett Packard	HP LaserJet Printers	188-189
060	Hyundai Electronics	Hyundai Monitors	412
084	Iiyama North America	Monitors	86
184	Iiyama North America	Monitors	40
263	Impression	Monitors	313
•	Intel Corporation	Pentium II Processor	38-39
166	Inteligis, Inc.	Plug-in Network	276
•	Imega Corporation	Mass Storage	253-256
380	Matrox Graphics, Inc.	Millennium G200	226
283	MegaHaus	Mass Storage	357
191	Meridian Data	Network Attached Storage Server	292-293
003	Micro Warehouse	Hardware, Software, Systems	364-365
091	Microtek	Imagodeck	335
290	Mitsubishi Electronics	Monitors	200
254	Monorail	Desktops	96
155	NEC Computer Systems	NEC Workstations	178-179
154	NEC Computer Systems	NEC Server	180-181
048	nVidia	3D Graphics Chip Set	242-243
117	Optiquest	071, V73, V75 Monitors	270
038	PC Connection	Mail Order	81-83
•	PC Mail	Hardware, Software, Peripherals	368-369
080	PC Power & Cooling Systems	Power Protection/Cooling Devices	94
239	Plextor	Plextor UltraPlex CD-ROM	336
287	ProGen	Desktops and Notebooks	98-99
078	Promise Technology	Promise IDE RAID Solutions	291
•	S.A.G./Storage Solutions	Servers and Storage	46
•	Seagate Technology	Mass Storage	31
227	Shamrock Peripherals, Inc.	Monitors	348
284	Smart and Friendly	CD Rocket 8x CD Recorder	417
167	Smile Int'l	Monitors	340
014	Sony Direct	Sony iC Chip Recorder	146-151
071	Sony Direct	Sony Mavica Camera	14
014	Sony Direct	Sony VAIO Digital Studio PC	146-151
388	Sony Electronics, Inc.	VAIO Micro Tower	54-55
066	TigerDirect	TigerDirect	423
377	Toshiba	Notebooks	26-27
028	U-Tron Technology	Network Solutions	8
118	ViewSonic	Brilliant PB17 Monitors	62-63
298	ViewSonic	Ultra Brite Projectors	88
043	Visioneer	PaperPort One Touch Scanner	264
•	Wal-Mart Stores, Inc.	Ink Cartridges	409
273	Xircom	RealPort Integrated PC Card	15
006	Xirlink	C-i Video Conferencing Camera	400
HUBS			
333	D-Link Systems	Switches	283
IMAGE EDITING SOFTWARE			
332	Corel Corporation	Corel WordPerfect Suite	268
INTERNET			
081	ACS Innovations	COMPRO Ezfone	281
•	BuyCom	Internet	78-79
•	Hughes Electronics	DirectPC	57-58
170	Interland	WebSite Hosting	328
•	Oracle Corporation	Oracle Designer	11
•	Shiva	VPNs	285
INTERNET SERVICE PROVIDERS			
089	Mindspring	Internet Access	290
LABEL/FORM SOFTWARE			
177	Card.II Software	Teleforms	307
LOCAL AREA NETWORKING			
360	CDW Computer Centers, Inc.	Networking Products	370-371

Infolink No.	Company	Product	Page
158	CDW Computer Centers, Inc.	Networking Products	68-69
159	CDW Computer Centers, Inc.	Networking Products	70-71
061	Data Comm Warehouse	DataComm Warehouse	297
MAIL ORDER			
360	CDW Computer Centers, Inc.	Reseller	370-371
158	CDW Computer Centers, Inc.	Reseller	68-69
159	CDW Computer Centers, Inc.	Reseller	70-71
•	Dell Computer Corporation	Latitude, Dimension & Servers	367
•	Gateway	Notebooks, PCs, Mail Order, Peripherals	48A-48L
•	MegaHaus	Mass Storage	357
283	PC Mail	Hardware, Software, Peripherals	368
066	TigerDirect	TigerDirect	423
MAPPING SOFTWARE			
240	ESRI	Mapping Software	298
169	Maptech	Mapping Software	407
MASS STORAGE			
•	Image Corporation	Mass Storage	253-258
191	Meridian Data	Network Attached Storage Server	292-293
283	MegaHaus	Mass Storage	357
027	Micro Solutions Computer Products	Backpack CD-Rewriter	366
239	Plexor	Plexor UltraPlex CD-ROM	336
078	Promise Technology	Promise IDE RAID Solutions	291
•	S.A.G./Storage Solutions	Servers and Storage	46-47
•	Seagate Technology	Mass Storage	31
284	Smart and Friendly	CD Rocket 8x CD Recorder	417
MEMORY			
203	Crucial Technology	Memory Upgrades	184-185
106	Kingston Technology Corporation	Memory	314
MISCELLANEOUS			
•	BuyCom	Internet	78-79
•	Choice Hotels International	Hotel	265
083	Digital Persona	U are U	421
053	Lexus Media	High Performance Digital Film	405
091	Microtek	Imagedeck	335
•	Orimar Golf Company	Golf Clubs	350
•	Pitney Bowes, Inc.	Personal Post Office	311
293	Play	Gump 98	403
•	Symantec Corporation	Small Business Solutions	191-194
•	Tektronix	Tektronix Family of Products	116-117
MODEMS			
•	3 Com Corporation	56K Modem	164-165
•	3 Com Corporation	3Com Megahertz	274
MONITORS			
096	Acer Peripherals America	AcerView Monitors	410
012	Chuntex Electronics Co., Ltd.	Monitors	342
140	Hitachi NSA	SuperScan Monitors	322
060	Hyundai Electronics	Hyundai Monitors	412
084	Iiyama North America	Monitors	40
184	Iiyama North America	Monitors	86
263	Impression	Monitors	313
036	Mitac International Corp.	Monitors	346-347
280	Mitsubishi Electronics	Monitors	200
157	NEC Technologies	LCD Monitors	C2-C4.1
127	Nokia Display Products	Monitors	245
117	Optquest	Q71, V73, V75 Monitors	270
•	PC Mail	Hardware, Software, Peripherals	368-369
151	Philips Electronics	Monitors	204
•	Samsung Electronics	Samsung Monitors	305
227	Shamrock Peripherals, Inc.	Monitors	348
167	Smile Int'l	Monitors	340
349	Tehung Co.	Monitors	341
019	TeleVideo	Monitors	308
118	ViewSonic	Brilliant P817 Monitors	62-63
MOTHERBOARDS			
056	A Trend Technology	Motherboard	309
MULTIMEDIA HARDWARE			
101	ATI Technologies	Rage 128 Technology	237-240
•	Gateway	Notebooks, PCs, Mail Order, Peripherals	48A-48L
027	Micro Solutions Computer Products	Backpack CD-Rewriter	366
NETWORK INTERFACE CARDS			
273	Xircom	RealPort Integrated PC Card	15
NETWORK SYSTEMS/EQUIPMENT			
355	Axx Communications, Inc.	ThinServer Technology	304A-304D
•	Intel Corporation	Intel PRO Adapter Cards	135
156	Intelligis, Inc.	Plug-in Network	276
191	Meridian Data	Network Attached Storage Server	292-293
051	Data Comm Warehouse	DataComm Warehouse	297
078	Promise Technology	Promise IDE RAID Solutions	291
105	Proum, Inc.	Proum Symphony	287
NETWORKING SOFTWARE			
213	Executive Software	Network Undelete	306
•	Hughes Electronics	DirectPC	57-59
•	Lotus Development Corporation	Lotus Development Corporation	210-211
070	Micrografx, Inc.	NetworkCharter Pro	326
•	Novell, Inc.	Netware 5.0	16-17
•	Quarterdeck Corporation	CleanSweep	199
NOTEBOOKS/LAPTOPS/PORTABLE PCS			
235	AMS Tech	Rodeo Notebooks	53
•	AST Computers	Notebooks, Desktops, Servers	65
•	Asustek	Notebooks	324-325
360	CDW Computer Centers, Inc.	Laptops	370-371
158	CDW Computer Centers, Inc.	Laptops	68-69
159	CDW Computer Centers, Inc.	Laptops	70-71
•	Compaq Computer Corporation	Compaq Computer Corporation	141
•	Compaq Works	Compaq Works	317
•	Dell Computer Corporation	Notebooks, Dimension & Servers	C5-C8
•	Dell Computer Corporation	Notebooks	90-91
•	Dell Computer Corporation	Dimension, Notebooks, Servers	160-161
•	Dell Computer Corporation	Notebooks	196-197
•	Dell Computer Corporation	Latitude, Dimension & Servers	367
•	Gateway	Notebooks, PCs, Mail Order, Peripherals	48A-48L
•	IBM Corporation	IBM ThinkPad	120-121

Infolink No.	Company	Product	Page
013	Micron	Micron Family of Products	169-171
098	Micron	Micron Family of Products	36A-37
119	Micron	Micron Millennia	5
036	Mitac International Corp.	Notebook Computers	346-347
154	NEC Computer Systems	NEC Server	180-181
•	PC Mail	Hardware, Software, Peripherals	368-369
287	ProGen	Desktops and Notebooks	98-99
290	Quantex Microsystems	Quantex Systems	105-110
014	Sony Direct	Sony iC Chip Recorder	146-151
014	Sony Direct	VAIO Digital Studio PC	146-151
377	Toshiba	Notebooks	26-27
242	Umax	Umax ActionBook 536T/736T	25
085	Winbook	Winbook 233 MHz Tillamook	415
OCR SOFTWARE			
345	Caere Corporation	OmniPage Pro 9.0	95
ON LINE SERVICES			
•	E*TRADE	Online Investing	230-231
OPERATING SYSTEMS			
•	Microsoft Windows CE	Microsoft Windows CE	2-3
•	Microsoft	Microsoft NT Server	219
•	Microsoft	Microsoft NT Server	221
•	Microsoft	Microsoft NT Server	223
•	Novell, Inc.	Netware 5.0	16-17
ORGANIZATIONAL SOFTWARE			
016	Enfish Technologies	Enfish Tracker Pro	352
PC ACCESSORIES			
032	Philips Electronics	USB Digital Speakers	414
357	Pison Dacom	Gold Card	289
•	Sony Electronics, Inc.	Digital Mavica	74
PCMCIA			
•	3 Com Corporation	3Com Megahertz	274
357	Pison Dacom	Gold Card	289
PERIPHERALS			
•	3 Com Corporation	56K Modem	164-165
096	Acer Peripherals America	AcerView Monitors	410
•	Altra	Altra MicroPoint	332
355	Axx Communications, Inc.	ThinServer Technology	304A-304D
•	Canon Computer Systems	MultiPASS Multifunction Printers	22-23
095	Creative Labs	Sound Card and Speakers	60A-60H
083	Digital Persona	U are U	421
005	Epson America	EPSON Stylus Color Printers	233
004	Epson America	EPSON PowerLite 5500C	50
•	Hewlett Packard	HP Color Printers	136-137
•	Hewlett Packard	HP LaserJet Printers	188-189
380	Matrox Graphics, Inc.	Millennium G200	226
091	Microtek	Imagedeck	335
117	Optquest	Q71, V73, V75 Monitors	270
038	PC Connection	Mail Order	81-83
330	PC Mail	Hardware, Software, Peripherals	368-369
284	Smart and Friendly	CD Rocket 8x CD Recorder	417
014	Sony Direct	Sony iC Chip Recorder	146-151
014	Sony Direct	VAIO Digital Studio PC	146-151
118	ViewSonic	Brilliant P817 Monitors	62-63
043	Visioneer	PaperPort One Touch Scanner	264
273	Xircom	RealPort Integrated PC Card	15
POWER PROTECTION			
162	American Power Conversion	Back-UPS Line	94
080	PC Power & Cooling Systems	Power Protection/Cooling Devices	94
PRINTER ACCESSORIES			
•	Canon USA	Canon USA - Graphic Systems	124-125
017	GCC Technologies	Elite Line of Printers	246-247
•	Pitney Bowes, Inc.	Personal Post Office	311
•	Wal-Mart Stores, Inc.	Ink Cartridges	409
PRINTERS			
•	Canon USA	Canon USA - Graphic Systems	124-125
•	Canon Computer Systems	MultiPASS Multifunction Printers	22-23
005	Epson America	EPSON Stylus Color Printers	233
017	GCC Technologies	Elite Line of Printers	246-247
082	Genicom	Printers	321
•	Hewlett Packard	HP Color Printers	136-137
•	Hewlett Packard	HP PhotoSmart	157
•	Hewlett Packard	HP LaserJet Printers	188-189
•	Hewlett Packard	Multifunction Printers	213
094	Lexmark International, Inc.	Lexmark Printers	203
330	PC Mail	Hardware, Software, Peripherals	368-369
024	QMS	Printers	294
•	Tektronix	Tektronix Family of Products	116-117
PROJECT MANAGEMENT SOFTWARE			
148	Primavera Systems	SureTrak 2.0	217
PROJECTORS/PANALS			
128	CTX OPTO	Portable LCD Projector	310
004	Epson America	EPSON PowerLite 5500C	50
•	Texas Instruments, Inc.	TI DLP	131-132
298	ViewSonic	Ultra Bright Projectors	88
REMOTE ACCESS SOFTWARE			
•	Novell, Inc.	Netware 5.0	16-17
•	Shiva	VPN	285
REMOTE COMPUTING			
•	3 Com Corporation	3Com Megahertz	274
002	HotOffice Technologies	HotOffice Technologies	279
SCANNERS			
•	Hewlett Packard	HP PhotoSmart	157
091	Microtek	Imagedeck	335
043	Visioneer	PaperPort One Touch Scanner	264
SECURITY SOFTWARE			
083	Digital Persona	U are U	421
299	McAfee Software	McAfee Office	112-113



Statement of Ownership, Management, and Circulation (Required by 39 USC 3685)

1. Publication Title PC Magazine	2. Publication Number 6 8 5 1 1 0	3. Filing Date 10/1/98
4. Issue Frequency Biweekly except in July and August	5. Number of Issues Published Annually 22	6. Annual Subscription Price \$49.97
7. Complete Mailing Address of Known Office of Publication (Not printer) (Street, city, county, state, and ZIP+4) One Park Avenue, New York, NY 10016		Contact Person Thomas Wallace Telephone (212) 503-6019
8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer) One Park Avenue, New York, NY 10016		
9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not leave blank) Publisher (Name and complete mailing address) Nancy Newman, One Park Avenue, New York, NY 10016 Editor (Name and complete mailing address) Michael J. Miller, One Park Avenue, New York, NY 10016 Managing Editor (Name and complete mailing address) Paul B. Ross, One Park Avenue, New York, NY 10016		
10. Owner (Do not leave blank. If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.)		
Full Name	Complete Mailing Address	
ZD Inc.	One Park Avenue, New York, NY 10016	
Ziff-Davis Inc.	One Park Avenue, New York, NY 10016	
11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box ☒ None		
Full Name	Complete Mailing Address	
None		
12. Tax Status (For completion by nonprofit organizations authorized to mail at special rates) (Check one) The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes: ☐ Has Not Changed During Preceding 12 Months ☐ Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)		

PS Form 3526, September 1995 (See Instructions on Reverse)			
13. Publication Title PC Magazine	14. Issue Date for Circulation Data Below October 20, 1998		
15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date	
a. Total Number of Copies (Not press run)	1,437,277	1,448,000	
b. Paid and/or Requested Circulation			
(1) Sales Through Dealers and Carriers, Street Vendors, and Counter Sales (Not Mailed)	146,594	145,000	
(2) Paid or Requested Mail Subscriptions (Include advertiser's proof copies and exchange copies)	1,031,874	1,037,477	
c. Total Paid and/or Requested Circulation (Sum of 15b(1) and 15b(2))	1,178,468	1,182,477	
d. Free Distribution by Mail (Samples, complimentary, and other free)	47,361	69,462	
e. Free Distribution Outside the Mail (Carriers or other means)			
f. Total Free Distribution (Sum of 15d and 15e)	47,361	69,462	
g. Total Distribution (Sum of 15c and 15f)	1,225,829	1,251,939	
h. Copies not Distributed			
(1) Office Use, Leftovers, Spoiled	16,445	23,061	
(2) Returns from News Agents	195,005	173,000	
i. Total (Sum of 15g, 15h(1), and 15h(2))	1,437,277	1,448,000	
Percent Paid and/or Requested Circulation (15c/15g x 100)	96.14%	94.45%	
16. Publication of Statement of Ownership ☐ Publication required. Will be printed in the December 1, 1998 issue of this publication. ☐ Publication not required.			
17. Signature and Title of Editor, Publisher, Business Manager, or Owner Charles Mast, Vice President, Circulation		Date 10/1/98	

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including multiple damages and civil penalties).

Instructions to Publishers

- Complete and file one copy of this form with your postmaster annually on or before October 1. Keep a copy of the completed form for your records.
- In cases where the stockholder or security holder is a trustee, include in items 10 and 11 the name of the person or corporation for whom the trustee is acting. Also include the names and addresses of individuals who are stockholders who own or hold 1 percent or more of the total amount of bonds, mortgages, or other securities of the publishing corporation. In item 11, if none, check the box. Use blank sheets if more space is required.
- Be sure to furnish all circulation information called for in item 15. Free circulation must be shown in items 15d, e, and f.
- If the publication had second-class authorization as a general or requester publication, this Statement of Ownership, Management, and Circulation must be published; it must be printed in any issue in October or, if the publication is not published during October, the first issue printed after October.
- In item 16, indicate the date of the issue in which this Statement of Ownership will be published.
- Item 17 must be signed.

Failure to file or publish a statement of ownership may lead to suspension of second-class authorization.

ADVERTISERS INDEX

Infolink No	Company	Product	Page
SERVERS			
•	AST Computers	Notebooks, Desktops, Servers	65
•	Compaq Computer Corporation	Compaq Computer Corporation	141-143
•	Dell Computer Corporation	Notebooks, Dimension & Servers	C5-C8
•	Dell Computer Corporation	Servers	12-13
•	Dell Computer Corporation	Dimension, Notebooks, Servers	150-161
090	Everex Systems International	Servers	266
•	Micron	Micron Family of Products	169-171
036	Mitac International Corp.	Servers	346-347
290	Quantex Microsystems	Quantex Systems	105-110
•	S.A.G./Storage Solutions	Servers and Storage	46
SOFTWARE			
347	Banner Blue	Family Tree Maker	413
345	Caere Corporation	OmniPage Pro 9.0	95
332	Corel Corporation	Corel WordPerfect Suite	268
016	Enfish Technologies	Enfish Tracker Pro	352
240	ESRI	Mapping Software	298
213	Executive Software	Network Undelete	306
211	Executive Software	Diskkeeper	320
•	Intuit, Inc.	Quicken	92
169	Maptech	Mapping Software	407
299	McAfee Software	McAfee Office	112-113
003	Micro Warehouse	Hardware, Software, Systems	364-365
070	Micrografix, Inc.	NetworkCharter Pro	326
•	Microsoft	Microsoft Windows CE	2-3
•	Microsoft	Microsoft NT Server	219
•	Microsoft	Microsoft NT Server	221
•	Microsoft	Microsoft NT Server	223
•	Microsoft	Microsoft Money 99	273
•	Oracle Corporation	Oracle Designer	11
209	Panda Software	Panda AntiVirus	295
397	Pantone, Inc.	Office Color Assistant	353
038	PC Connection	Mail Order	81-83
330	PC Mail	Hardware, Software, Peripherals	368-369
293	Play	Gizmo 98	403
148	Primavera Systems	SureTrak 2.0	217
•	Quarterdeck Corporation	CleanSweep	199
•	SPSS, Inc.	SPSS 9.0 for Windows	363
•	Visio	Visio IntelliCAD	235
SOUND BOARDS			
095	Creative Labs	Sound Card and Speakers	60A-60H
•	Diamond Multimedia Systems	Sonic Impact	45
STATISTICAL SOFTWARE			
•	SPSS, Inc.	SPSS 9.0 for Windows	363
SWITCHES			
059	Cyber Corporation	SwitchView	268
333	D-Link Systems	Switches	283
TELECOMMUNICATIONS			
081	ACS Innovations	COMPRO Ertone	281
TRADE SHOW			
007	Tape Computer Association	1999 Taipei in I Computer Show	349
•	ZD Events	Tradeshaw	358
TRAINING/SEMINARS/CONFERENCES			
•	ZD Events	Tradeshaw	358
UTILITIES			
213	Executive Software	Network Undelete	306
211	Executive Software	Diskkeeper	320
299	McAfee Software	McAfee Office	112-113
•	Quarterdeck Corporation	CleanSweep	199
VIDEO CONFERENCING			
006	Xirlink	Cit Video Conferencing Camera	400
VIDEO/GRAPHIC BOARDS			
077	3Dfx Interactive	3D Graphics Chip Set	248-249
232	Elsa, Inc.	3D Graphics Accelerator Boards	411
200	Gigabyte	Motherboard	339
380	Matrox Graphics, Inc.	Millenium G200	226
•	Number Nine Computer Corp.	Graphics Boards	272
046	nVidia	3D Graphics Chip Set	242-243
VOICE RECOGNITION SOFTWARE			
064	Lamout & Hauspie	Voice Xpress Products	158
WEB SOFTWARE			
•	Lotus Development Corporation	Lotus Development Corporation	210-211
WEB/INTERNET SERVICES			
355	Axis Communications, Inc.	ThinServer Technology	304A-304D
WINDOWS SOFTWARE			
177	Cardiff Software	Teleforms	307
293	Play	Gizmo 98	403
•	SPSS, Inc.	SPSS 8.0 for Windows	363
243	Viagrafix	Design CAD	312
WIRELESS NETWORK EQUIPMENT			
166	Integrals, Inc.	Plug-in Network	276
105	Proxim, Inc.	Proxim Symphony	287
WORKSTATIONS			
136	BOLData	Systems	72
•	Dell Computer Corporation	Workstation	258-259
155	NEC Computer Systems	NEC Workstations	178-179
028	U-Tron Technology	Network Solutions	8

For Additional Categories see MARKETPLACE PRODUCT INDEX PAGE 373.

Give Your Computer The Finger!

U.are.UTM Fingerprint Recognition System

Forget passwords!

Replace them with your fingerprint.

Gain instant, secure Windows[®] and internet access with one touch.

Encrypt and decrypt your data on the fly with U.are.U[™] Private Space.

U.are.U[™] is fast,

It's accurate,

It's winning awards.

Order Today!

U.are.U[™] Applications:

One Touch Login gives you secure access to Windows[®] with the touch of a fingerprint.

One Touch Password lets you replace all your passwords with your fingerprint.

One Touch Screensaver prevents "accidental" readings or changes to your work-in-progress when you leave your desk.

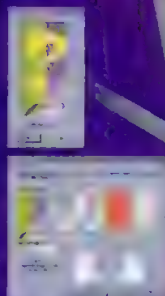
U.are.U[™] Private Space creates a protected, fingerprint enabled drive and encrypts anything you put there.

USB

Plugs into your USB port



"Because It's Really You"



Easy to set up and use.
Fast to log on.

starting from
\$99.00

www.digitalpersona.com

or call toll free **877 378 2738**

Choose 083 at www.pcmag.com/infotink



TigerSystems The Premium

800-879-1595

24 HOURS A DAY! IN CANADA CALL: 800-888-6167

HARDWARE, SOFTWARE, SYSTEMS, ACCESSORIES. THE INDUSTRY'S BEST TELEPHONE SALES STAFF!

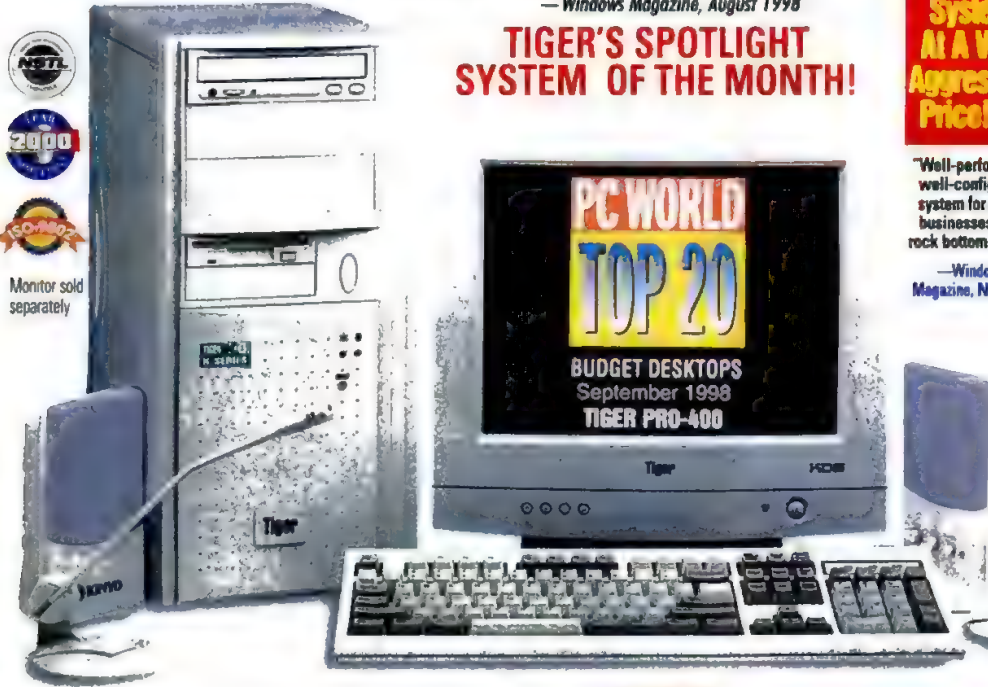
Premium Components! Quality Craftsmanship! Top Value!

AMD K6-2 350MHz \$999⁹⁹ #TS3-M-12B

"The Fastest And Most Capable Sub-\$1,000 PC Ever..."

—Windows Magazine, August 1998

**TIGER'S SPOTLIGHT
SYSTEM OF THE MONTH!**



Monitor sold separately

"A Hot System At A Very Aggressive Price!"

"Well-performing, well-configured system for small businesses, at a rock bottom price."

—Windows Magazine, Nov. '98

Monitor sold separately



Editors' Choice

"It's a great bargain PC with room to grow...its performance numbers rival some Pentium II-300 systems we've tested."

—Computers.com, Editor's Choice



The Tiger Family of PCs Awarded the Prestigious WIN 100 honor! —June 1998

Pentium II 300... "BEST BUY!"

WINLIST Windows Magazine 1998

"Quality construction and top-level components at a low price..."

Windows Magazine, April '98

...On the Pentium 200 MMX... "An office tool you'll respect."

PC Computing, May '98



"Competitive features and performance from the first PII-400 on the budget chart."

PC World, September '98

The Tiger Professional Line Custom Configurations Available! Intel Pentium II 333MHz

64MB Premium-Speed SDRAM (PC100 SDRAM in 350, 400, 450 & K6-2)
8.4 Gigabyte UDMA Hard Drive (10.2GB Quantum in K6-2 333, K6-2 350, P II 450)
17-Inch Tiger Monitor (.28mm Dot Pitch) Viewable: 15.8"
32-Speed CD-ROM Drive, 1.44MB Floppy Drive
128-bit AGP 3D w/4MB (128-bit AGP 3D w/8MB in K6-2 333, 350, P II 350, 400, 450)
56K HyperModem (With Fax & Voice)
Yamaha Wave Table 3D Sound card, Boom Microphone
Amplified Stereo Speakers
6-Bay Case With 235-Watt Power Supply
Case Features Tiger-Exclusive 4-cooling fan design
Microsoft Windows 98 Pre-Installed and ready to run!
Windows 98 Premium Keyboard
Microsoft IntelliMouse

**LOWEST PRICES
GUARANTEED!**

\$1,049⁹⁹

Order # CTJTM10
INCLUDES 17" MONITOR!

TOLL-FREE TECHNICAL SUPPORT

OTHER VALUES (All Including 17" Monitors)

AMD K6-2	300MHz	\$924.99	(CTJTM17)
IBM/Cyrix 6x86	PR333	\$949.99	(CTJTM23)
Intel Pentium II	300MHz	\$1019.99	(CTJTM9)
Intel Pentium II	333MHz	\$1049.99	(CTJTM10)
AMD K6-2	333MHz	\$1069.99	(CTJTM26)*
Intel Pentium II	350MHz	\$1129.99	(CTJTM11)
AMD K6-2	350MHz	\$1169.99	(CTJTM35)**
Intel Pentium II	400MHz	\$1359.99	(CTJTM12)*
Intel Pentium II	450MHz	\$1669.99	(CTJTM29)**

*Includes 36MB PC100 SDRAM **128MB PC100 SDRAM.

"BEST BUY!"

Windows Magazine, April '98

WinList

TigerLEASE
\$37/mo.

The Tiger Small Office Line Feature System Exceptional Value! IBM/Cyrix 6x86 PR300 Systems

64MB High-Speed EDO RAM
4.3 Gigabyte UDMA Hard Drive
24-Speed CD-ROM Drive
15-Inch Tiger Monitor (.28mm Dot Pitch) Viewable: 13.9"
64-Bit 3D Video With 4MB RAM
56K Flex FaxModem
Wave Table 3D Sound Onboard, Boom Microphone
Amplified Stereo Speakers

9-Bay Case/200-Watt Power Supply
1.44MB Floppy Drive
Microsoft Windows 98
Pre-Installed
Premium 104-key Windows Keyboard
And PS/2 Mouse
TOLL-FREE TECHNICAL SUPPORT

TigerLEASE
\$26/mo.

\$739⁹⁹

Part # CTJTM28
INCLUDES 15" MONITOR

OTHER GREAT PC VALUES

(All Include 15" Monitors)

AMD K6-2 300 MHz	\$759.99	(CTJTM30)
IBM/Cyrix 6x86 PR300	\$739.99	(CTJTM28)

10 Years In The PC Business! "THE TOP-DRAWER COMPONENT SYSTEMS"



Why Buy A TigerSystems PC...

- On-Site Set-Up, Installation And Training Available By Dow Jones Technicians!
- We Make Our Systems Easy To Own With...
New! TigerLEASE
Our new Tiger Lease System makes sense—it's affordable, easy, flexible—and it gives you the opportunity to affordably upgrade your system when the hotter new models come out in a couple of years!
- We Provide An Ironclad Guarantee!
Plus Toll-Free 800 Phone Technical Support!

TigerSystems MONITOR UPGRADES

Upgrade Your Display When You Order!

Tell Your Sales Agent To "SUPER-SIZE" Your Monitor—And Save!

Upgrade From 15-inch TO 17-inch	 \$110.00
Upgrade From 15-inch TO 19-inch	 \$370.00
Upgrade From 17-inch TO 19-inch	 \$260.00

Sorry, but as prices are always changing on CPUs, we do not offer price protection in the event prices rise or fall. Prices and configurations subject to change. Not responsible for typographical errors. Systems include a one-year upgradable warranty. Please see our warranty policy on the Web: www.tigerdirect.com/warranty

Component PC Systems!

Now you can shop with us ON-LINE! www.tigerdirect.com

Why Wait? We'll Ship TODAY!

SOLIS

World's Best Pentium II 266 Notebook

PENTIUM POWER, BRILLIANT DISPLAYS! FIVE MODELS AVAILABLE, AND WE'LL CUSTOM CONFIGURE ANY OF THEM!
12.44"x 9.84"x 1.38"



Weights
6.4lb.
and just 5.8 lbs.
with weight-
saving module

Tiger's New Solis Notebook INTEL PENTIUM II 233 With 14.1 or 13.3 Active Matrix Display!

Solis notebooks are crafted from the highest quality components—from the power supply to the spectacular screen display. Packed with the latest Intel mobile Pentium and Pentium II processors, common docking solutions, CD-ROM and floppy drives—plus a new lightweight design, Solis notebooks represent the best value in the industry. The ultra-slim breakthrough design makes the Solis one of the world's thinnest notebooks. Along with a lightning-fast processor and a razor-sharp Active Matrix display, The Solis Series features massive hard drives, MagicGraph 128XD multimedia accelerator and much more. **Includes new Windows 95!**



"This bargain system's performance, battery life and usability beat those of many other predators...Solid speed, decent battery life...lightweight; nicely configured...We loved the Solis's creature comforts, including a desktoplike keyboard and superior hardware wavetable sound." —CNET Computers.com

From **\$1899⁹⁹** Order # SOST-13J

TigerLEASE
FROM **\$67/month**

Close-Up

THIN, LIGHT... 12.44" wide x 9.84" deep x 1.38" high. One of the industry's thinnest notebooks! Just 6.4 pounds!

CHIP SET: Intel 440BX (Pentium II), 440LX (Pentium)

MEMORY: 32MB SDRAM, upgradable to 96MB. 512KB Pipeline Burst cache.

HARD DRIVE: One 2.5" HDD PCI bus, Master Enhanced IDE; Ultra DMA/33.

Supports 5.25" CD-ROM, DVD, LS-120 or Floppy drive; secondary IDE supports second battery.

1024 x 768 Active Matrix (13.3" or 14.1" XGA).

MagicGraph 128XD multimedia accelerator; simultaneous display screen and external monitor.

PC Card 95: one type 3 or two type 2 card sockets, PCI card bus; both support 2V card.

KEYBOARD: 87 keys, embedded number keys, palm-rest.

DUAL CONTROLS: Touch Pad with 2 Buttons.

AUDIO: WSS and SoundBlaster compatible 16-bit stereo audio; built-in microphone and stereo speakers; audio ports include microphone-in, line-in and headphone-out.

POWER: 9 Lithium-Ion battery gives you 3.3 hours operation with Power Management Unit disabled; charges in 1.7 hours.

I/O PORTS: Includes one port each for serial, parallel, external FDD module, VGA, keyboard, mouse, docking station, USB.

OPERATING SYSTEM: Microsoft Windows 95, pre-loaded

An Outstanding Notebook!...

CUSTOM CONFIGURATION OPTIONS!

- Upgrade 3.5 Floppy To LS-120 Superdisk ... **\$129.99**
- Upgrade 24X CD to DVD Drive & Decoder ... **\$299.99**
- Upgrade from 32MB Memory to 64MB ... **\$49.99**
- Upgrade from 32MB Memory to 96MB ... **\$99.99**
- Upgrade from 64MB Memory to 96MB ... **\$49.99**
- Upgrade from 2.1GB to 4GB Hard Drive ... **\$159.99**
- Upgrade from 2.1GB to 6.4GB Hard Drive ... **\$319.99**
- Extra LiOn battery ... **\$129.99**
- Extra AC Adapter/Charger ... **\$49.99**
- Port Replicator ... **\$199.99**
- PCMCIA 56.6 Fax Modem ... **\$99.99**
- Upgrade to 24 Month Factory Warranty ... **\$79.99**
- Microsoft Office or Corel WordPerfect Suite ... **CALL**

Item#	Processor	Memory	Hard Drive	CD-ROM	Display	Tiger Easy Pay	Price
SOST-13G1	Intel Pentium Mobile 266 MMX	32MB EDO	2.1 GB UDMA	24X	13.3" Active Matrix	\$65	\$1,849.99
SOST-13J	Intel Pentium II 233	32MB EDO	2.1 GB UDMA	24X	13.3" Active Matrix	\$67	\$1,899.99
SOST-14A1	Intel Pentium II 233	64MB EDO	2.1 GB UDMA	24X	14.1" Active Matrix	\$72	\$2,039.99
SOST-14D1	Intel Pentium II 266	64MB EDO	4.0 GB UDMA	24X	14.1" Active Matrix	\$81	\$2,329.99
SOST-14F	Intel Pentium II 266	96MB EDO	6.4 GB UDMA	24X	14.1" Active Matrix	\$90	\$2,569.99
SOST-14H	Intel Pentium II 300	96MB EDO	6.4 GB UDMA	24X	14.1" Active Matrix	\$101	\$2,849.99

Tiger's DEAL Of The Month!

TigerSystems Super Value IBM 6x86 PR300

32MB High-Speed EDO RAM
3.2 Gigabyte UDMA Hard Drive
14-Inch Tiger Monitor (.28mm Dot Pitch)
Viewable: 13.2"
24-Speed CD-ROM Drive, 1.44MB Floppy Drive
64-Bit 3D Video Card With 4MB RAM
56K Flex FaxModem
Wave Table 3D Sound Onboard

INCLUDES 15" MONITOR!

\$629⁹⁹

Part # CTJTM36
INCLUDES 14" MONITOR

Amplified Stereo Speakers
Boom Microphone
Premium 104-key Windows
Keyboard and PS/2 Mouse
9-Bay Case w/200-Watt Power Supply
MS Windows 98 Pre-Installed
TOLL-FREE TECHNICAL SUPPORT

TigerLEASE
\$23/month

ONE-YEAR DEPOT WARRANTY

CALL TODAY FOR YOUR FREE TIGER CATALOG!

CALL OUR KNOWLEDGEABLE SALES STAFF. WE'RE STANDING BY TO HELP YOU 24 HOURS!

800-879-1595

INTERNATIONAL SALES: (305) 228-5200

CANADA: 800-888-6167

Tiger Special Offers For This Month...



MEMORY SALE!

- 16MB 72-Pin EDO **\$19.99**
- 32MB 72-Pin EDO **\$39.99**
- 32MB 168-Pin SDRAM **\$34.99**
- 64MB 168-Pin SDRAM **\$79.99**

Seagate

Hard Drive SALE!

4.3GB \$134⁹⁹
THD-4A 4.3GB UDMA **\$134.99**

Exclusive! Premium-Quality "Customize-It-Yourself" PC Kit!



\$149⁹⁹
3-units+ # KT2-T-1A

Just Add CPU, Hard Drive And Memory!

56K Modem Blowout.

Rockwell-Based 56.6K Flex, Fully Compatible Modem With 230K Hyper Modem Feature!

- Full Duplex Speakerphone
- Up to 230,000 bps!
- Voice, Data, Fax, SVD, Caller ID
- Full hardware modem!

Order# **A109-1028** **AMQUEST**

21" ALT Monitor

\$599⁹⁹

1600 x 1200 max. res., 28mm dot-pitch, giant 19.9" view area, flat-screen
K26-1010

lomega Zip Insider!

\$74⁹⁹ # D55-9902 NM



Also Available:
Zip Disks: **\$8⁹⁹** Per Disk! # I21-1221

OUR 10 YEAR

Call Us For Powerful Servers, New Notebooks, PC Cinema DVD, Workstations, Custom Quotes, Build-To-Order PCs: 800-879-1595

Sorry, but as prices are always changing on CPUs, we do not offer price protection in the event prices rise or fall. Prices and configurations subject to change. Not responsible for typographical errors. Systems include a one-year upgradable warranty. Please see our warranty policy on the Web: www.tigerdirect.com/warranty

Choose 066 at www.pcmag.com/infolink

abort. retry. fail?

THE LIGHTER SIDE OF
PERSONAL COMPUTING

By Don Willmott

Order now & get a free T-shirt for \$189

Valid through 9/30/98. Mention offer # 80801-01.

Allow 4-6 weeks delivery for the T-shirt



Thanks but no thanks
to Advantageware
for this very
compelling offer.

Software-ectomy

"CyberMedia alleges [that a Symantec program called Norton Uninstall Deluxe] includes computer code stolen from CyberMedia's own product for removing software from a person."—*The Wall Street Journal*

JET'S IDEA

MEN'S SOCKS
COTTON
COMPUTERIZED

70% COTTON
30% NYLON



Here they are! The smartest
socks in the world.



ARF on the Road:
Winchester,
Virginia.

tue	wed	thu	fri	sat
PM T-storms 73°/105°	Partly Cloudy 75°/103°	Partly Cloudy 74°/104°	Partly Cloudy 73°/102°	Partly Cloudy 74°/101°

Supplied by [The Weather Channel](#). Updated Jul 20, 1998 5:18 PM.

Rocky Mountain Pi

Let's hear it for 28-year-old Aaron Blosser, who hacked into Denver-based US West's computer system in September and commandeered 2,500 phone-answering computers to help him solve a 350-year-old math problem. Seems that Blosser ran up 10.63 years of computer time while on the hunt for a new prime number. Call it "Revenge of the Math Nerds."

The Bakersfield,
California,
weather report
for July 20,
courtesy of
Microsoft Start.
Here's hoping
the rain cools
things off.

WHEN POWER USERS WANT PERFORMANCE **AND** FUN, THEY TURN TO THE
HiJinx Interactive Workstation

17" FunHouse® monitor
distorts and bends your
files into interesting and
engaging documents

6.4GB hard disk has
SquirtingFlower®
processor

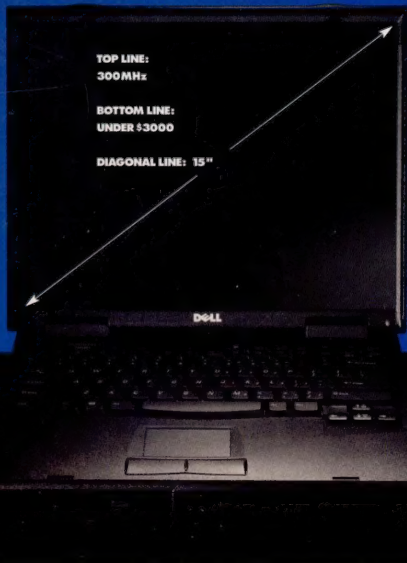
AirJet® keyboard sends
hats, wigs & toupees
flying around the room

JoyBuzzer® trackball
keeps users howling



If your entry is used, we'll send you \$50 and a *PC Magazine* T-shirt. Send your entries to Abort, Retry, Fail?, *PC Magazine*, One Park Ave., New York, NY 10016-5802, or via e-mail to don_willmott@zd.com. Winners this issue: Mary Cutler, Joanne Golding, Jerry Howard, George Joseph, and Yakov Shafranovich.

FOR TOP-LINE, BOTTOM-LINE AND DIAGONAL-LINE PEOPLE.



Such a small price for such a big-screen portable. We'll repeat the facts: our 15" display. Pentium® II processor at 300MHz. Only \$2999. Other relevant facts: 2X AGP video for outstanding resolution and color, with optional DVD and other high-end options available. Bottom line: great deal. Call, or click on our website for more information about the Dell® Inspiron™ 7000.

DELL® INSPIRON™ 7000 D300LT PENTIUM® II PROCESSOR AT 300MHz

All-in-One Multimedia Performance

- 15" XGA Active Matrix Display
- 64MB SDRAM (384MB Max*)
- 4GB Ultra ATA Hard Drive
- Removable Combo 24X Max** Variable CD-ROM and 3.5" Floppy Drive
- 2X AGP 4MB ATI Rage Pro 3D Video
- 3D Surround Sound and Hardware Wavetable
- Intelligent Lithium Ion Battery
- Internal 56K Capable® V.90 Fax Modem
- Microsoft® Office 97 Small Business Edition v2.0
- Microsoft Windows® 98
- Touchpad

• 3-Year Limited Warranty†

* Upgrade to 96MB SDRAM, add \$99.

\$2999

Business Lease*: \$114/Mo., 36 Mos.
Order Code #691103

TO ORDER BY PHONE

Keycode #04911

800-822-6057

M-F 7a-9p • Sa 10a-6p • Su 12p-5p CT

In Canada* call 800-233-0702

In Mexico* call 001-800-210-7607

GSA Contract #GS-35F-4076D

BUILD YOUR OWN AND ORDER ONLINE

BE DIRECT™ **DELL®**
www.dell.com/buydirect



**TWICE THE SPEED.
TWICE THE SPEED.**

**TWICE THE MEMORY.
TWICE THE MEMORY.**

**DON'T THINK TWICE.
DON'T THINK TWICE.**

INTRODUCING OUR NEW 16MB VIDEO CARD.



**NEW DELL® DIMENSION® XPS R450
PENTIUM® II PROCESSOR AT 450MHz**

- 128MB 100MHz SDRAM
- NEW 12.9GB Ultra ATA Hard Drive
- 17" (15.9" viewable) 1000LS Monitor
- NEW 16MB STB nVidia TNT 3D AGP Graphics Card
- 40X Max™ Variable CD-ROM Drive
- Turtle Beach Montego A3D 64V Sound Card
- harman/kardon HK-195 Speakers
- Iomega Zip 100MB Internal Drive with One Cartridge
- MS® Office 97 Small Business Edition v2.0 plus Bookshelf 98; McAfee VirusScan
- MS Windows® 98
- Dell QuietKey® Keyboard
- MS IntelliMouse®
- 3-Year Limited Warranty¹
- 1-Year On-site² Service
- ★ NEW 3Com® USRobotics V.90™ PCI WinModem with NEW 30-Day FREE ConnectDirect™ Internet Access³, add \$49.
- ★ Upgrade to a 19" (18.0" viewable, .28dp) Trinitron® P990 Monitor, add \$259.

Compared to our 8MB video card, the NEW 16MB video card on the Dell® Dimension® XPS R450 gives you twice the memory and twice the speed in high-resolution 3D!¹ Stay ahead of the technology curve with graphics that are faster and more detailed than Dell has ever offered. And at this price, the value is crystal clear. Call or visit our website to order.

TO ORDER BY PHONE

Keycode #04910

800-822-6057

M-F 7a-9p • Sa 10a-6p • Su 12p-5p CT
In Canada,* call 800-233-0702
In Mexico,* call 001-800-210-7607
GSA Contract #GS-35F-4076D

BUILD YOUR OWN AND ORDER ONLINE

BE DIRECT™

DELL®

www.dell.com/buydirect

\$2199

Business Lease²: \$83/Mo., 36 Mos.
Order Code #591115

